Jan. 2, 1945. D. R. McNEAL 2,366,451

STRAINER

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Fig. 1.

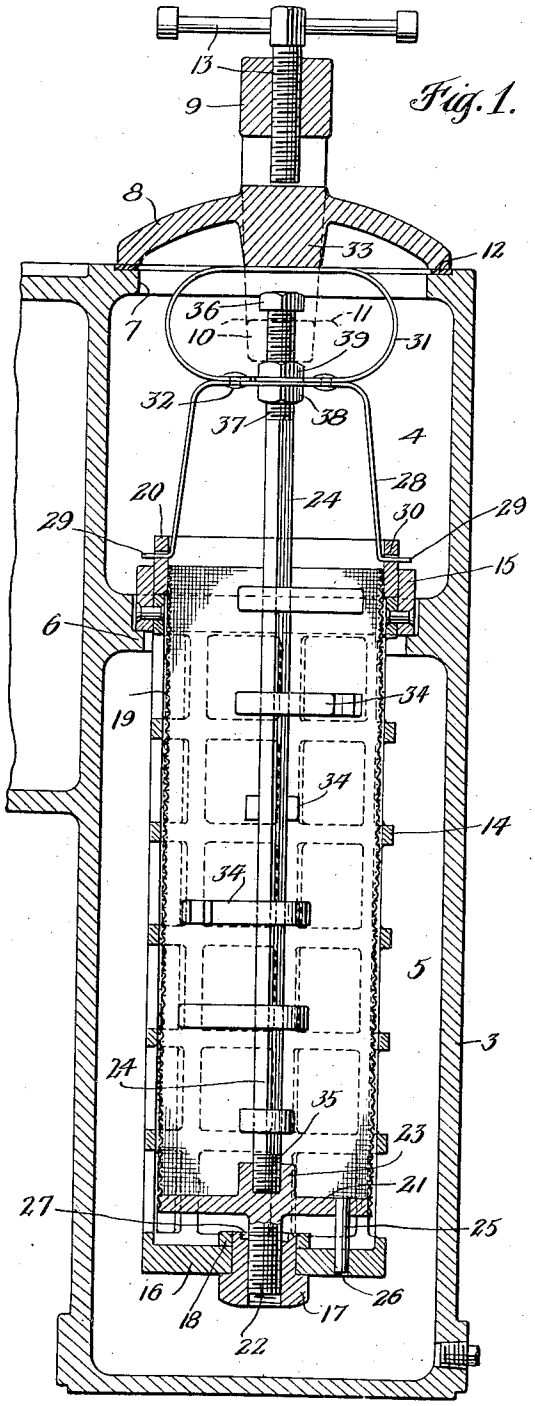
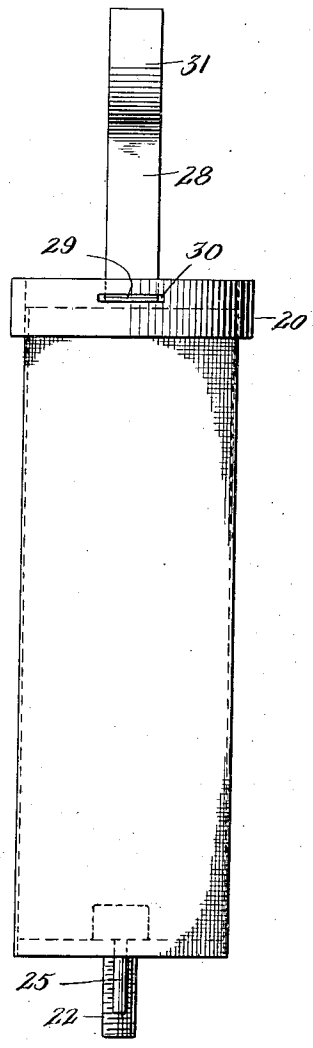


Fig. 2.



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STRAINER

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15 Claims. (Cl. 210—154)

This invention relates to strainers and is particularly concerned with certain improvements in the basket type of strainer where the straining generally takes place from the inside to the outside of the basket—dirt being caught at the inner side of the basket walls.

Strainers of this type are frequently used in pairs in a suitable casing provided with valves by means of which one strainer or the other may be isolated and removed for purposes of cleaning, repair, replacement or substitution by a strainer of different mesh while the other strainer remains in service.

Where the mesh is relatively fine and composed of suitable wire screening it has been customary in previous practice to secure the wire to the inside of a supporting shroud of grill-like construction the openings of which are not intended to effect any straining action. The wire has been permanently secured in the shroud by means of rivets or the like so that the two portions or elements of the strainer have formed a unitary bucket-like structure which is relatively expensive to replace in case a new one is required or a substitution desired. Furthermore, in situations where circulation of the fluid to be strained is secured by means of a pump and especially where the pressure involved may be rather high, the fluctuations of the pump have a tendency to cause a "beating" or "fluttering" of the mesh of the wire against the supporting bars of the shroud which is frequently sufficiently pronounced to cause early cutting of the wire and the necessity for replacement which, as stated, has involved either the relatively expensive substitution of an entirely new unit or a very troublesome repair.

With the foregoing in mind the principal objects of my invention will be better understood, and they may be said to consist in the provision of an improved strainer in which the mesh basket is made as an easily replaceable stocking adapted for insertion and removal in a suitable supporting shroud; the provision of means for greatly minimizing, if not entirely eliminating, the effect of the pump fluctuations on the screen; the provision of a straining bucket into which any one of a plurality of mesh baskets of different mesh can be readily inserted; the provision of a combined shroud and inner mesh which, while separable, can be handled as a unit for insertion in and removal from the straining compartment of the strainer; the provision of a bucket-type strainer of the character described in which a tight seal is always maintained between the mesh basket and the shroud basket and between the shroud basket and the strainer pocket or compartment; and the provision of a structure which is very much less expensive to maintain and one in which replacements of the mesh basket can be made at a minimum of expense.

The foregoing objects, together with such other objects as may appear hereinafter, or are incident to my invention, are realized by means of a construction which is illustrated in a preferred form in the accompanying drawing, wherein—

Figure 1 is a vertical section through a strainer compartment showing my improved structure inserted therein; and

Figure 2 is a side elevation of the removable mesh basket of my invention taken at right angles to the view shown in Figure 1.

The strainer compartment 3 may be one of a pair of compartments, the other of which is not illustrated because it is a counterpart of the one shown. The fluid enters the upper chamber 4 which is separated from the lower or outlet chamber 5 by means of the inner shoulder 6 and the strainer bucket adapted to be carried thereon, as will more fully appear hereinafter. The strainer is arranged to project downwardly into the lower compartment 5, and the straining takes place from the inside to the outside of the basket. The upper chamber 4 is provided with an opening 7 adapted to be closed by the cover 8 which can be clamped in position in any suitable manner as by means of the U-shaped strap 9 having suitable lugs 10 which engage under shoulders 11 on opposite sides of the compartment 3, the lid 8 being forced downwardly against the gasket 12 by means of a screw jack 13 passing through the upper portion of the yoke 9. The structure so far described is quite well known in the art and in and of itself forms no part of the present invention.

My improved strainer bucket comprises the outer shroud basket 14 which is provided at its open end with an annular flange 15 adapted to seat upon the shoulder 6. The bottom 16 has a central opening through which passes what I term a union nut 17 which has an external ring 18 secured to its inner end. The nut fits loosely in the opening in the bottom plate 16, being held in place by the ring 18 and the head of the nut. The purpose of this will appear below.

Within the shroud 14 I provide the inner or mesh basket 19 to the upper open end of which is suitably secured an annular supporting collar 20, the lower portion of which collar fits within

the flange 15 and is adapted to rest upon the top of the shroud, as clearly shown in Figure 1. The bottom of the mesh basket 19 is closed by a plate 21 having a downwardly projecting central stem 22 which is suitably threaded to cooperate with the threads in the nut 17. On its inner face this plate 21 is provided with a projecting boss 23 which is centrally apertured and threaded to receive the lower end of a magnet supporting rod 24.

Projecting also from the bottom face of the plate 21 is a positioning pin 25 adapted to enter an aperture 26 in the bottom plate 16 of the shroud basket. This pin prevents relative rotation between the mesh basket and the shroud basket under the whirling effect of the fluid as it passes through the strainer.

In assembling the two baskets the mesh basket is placed into the shroud basket with the pin 25 in registry with the hole 26 and with the stem 22 projecting toward the opening in the nut 17. Incidentally, the opening in the nut 17 may be provided with a slight annular pocket 27 so as to facilitate proper entry of the stem. The nut 17 is then rotated in order to draw the stem 22 downwardly thereinto. This action, of course, places tension upon the wire of the mesh basket and draws the collar 20 tightly against its seat within the flange 15, so as to prevent all possibility of leakage from the unstrained side to the strained side of the compartment 3. The tension which is thus placed upon the mesh basket is sufficient to hold it firmly against flapping or fluttering incident to the fluctuations of the pump so that damage from this source is practically entirely eliminated.

A bail-like handle 28, preferably composed of some suitable spring metal, is secured to the collar 20 by means of the outwardly extending ends 29 which are adapted to project through suitable opposed slots 30 in the collar 20, the ends 29 being inserted in the slots 30 by pressing the sides of the handle inwardly until the ends clear the inner edge of the ring 20, after which they will spring outwardly into the position shown in Figure 1. The ends 29 fitting into the slots 30 serve to hold the handle in its proper upright position.

On the top of the bail-like handle 28 is a spring bow 31 which may be secured in place as by the rivets 32. The spring bow 31 is arranged to come directly under the inwardly projecting boss 33 on the under side of the cover 8 so that when the cover 8 is in closed position, the boss 33 will press against the bow 31 which, in turn, transmits the thrust to the bail 28, the collar 20, the flange 15 and the shoulder 6. In this way an absolutely tight seal is always insured between the flange 15 and the shoulder 6, so that, here again, all possibility of leakage from the dirty side to the clean side is avoided.

It will be seen that the handle with its upper bow-like member provides a construction which can be easily and quickly applied to or removed from the bucket as well as one which is adapted to act as a means for transmitting pressure from the lid boss 33 to the bucket seat whereby fluid tightness is insured. Furthermore, my improved handle is strong and durable and eliminates the breakage which has been encountered with the old style simple bail.

In some straining operations magnets are employed, and in my improved construction a series of horseshoe magnets 34 are carried by the rod 24, one above the other, as shown, and radiating from the rod in different angular positions with the open ends of the U in close proximity to the screen of the mesh basket. The lower end of the rod is threaded as at 35 and can be screwed into the boss 23 by grasping the nut 36 which is pinned to the top of the rod. Where the rod 24 passes through the top of the bail 28 and the bottom of the bow 31 it is threaded as at 37 to accommodate the holding nuts 38 and 39. In case magnets are not desired, which is true in many installations, the rod 24 with its magnets and holding nuts can be omitted without in any way interfering with the rest of the structure.

Where the magnets are employed, as shown, assembly is effected by first placing on the rod 24 the nut 38 and then projecting the upper end of the rod through the opening in the top of the bail 28 and the bottom of the bow 31, after which the nut 39 is placed in position and finally the nut 36 by means of which the rod 24 can be rotated, the nut 36, as stated before, being pinned to the rod for this purpose. With the nuts 38 and 39 backed away from the bail 28 and bow 31, the rod and handle structure can then be attached to the basket structure by screwing the end 35 of the rod into the boss 23, compressing the sides of the bail 28 until the ends 29 are in position to snap into the slots 30, and then finally screwing up on the nuts 38 and 39 so that they firmly clasp the top of the bail and the bottom of the bow. It will be understood, of course, that this is done after the mesh basket has been inserted in the shroud basket and the nut 17 turned to place the mesh under tension, as previously described.

It will be seen that my improvements make it possible to readily replace a mesh basket without the necessity of replacing the shroud since the mesh basket can be quickly removed from the interior of the shroud. At the same time, the mesh basket and the shroud basket can be handled as a unit in exactly the same way as is customary with the present type of strainer bucket where the mesh basket is riveted or otherwise permanently secured to the shroud. This reduces the cost of repairs to an absolute minimum and makes it possible for the user to carry in stock a number of mesh baskets of whatever mesh may be desired so that changes from one mesh to another can be quickly and easily made.

The tension which is placed on the mesh of the mesh basket by means of the nut 17 serves to hold the wire in a taut condition so that "beating" or "fluttering" under variations in pump pressure are practically eliminated and damage from this source reduced to a minimum.

I claim:

1. A bucket-type strainer unit including an outer perforated shroud basket, a removable mesh basket within and closely fitting the interior of said outer shroud basket, a supporting collar at the top of the mesh basket adapted to seat on the shroud basket, and means for detachably connecting the lower portions of the two baskets including means for moving the bottom of the mesh basket toward the bottom of the shroud basket whereby to place the mesh under tension.

2. A bucket-type strainer unit including an outer perforated shroud basket, a removable mesh basket within and closely fitting the interior of said shroud basket, means for detachably connecting the bottom of the mesh basket to the bottom of the shroud basket including means for moving the bottom of the mesh basket toward the bottom of the shroud basket whereby to place the mesh under tension, and a handle on the top of the mesh basket.

3. A bucket-type strainer unit including an outer perforated shroud basket, a removable mesh basket within and closely fitting the interior of said shroud basket, means for detachably connecting the bottom of the mesh basket to the bottom of the shroud basket including means for moving the bottom of the mesh basket toward the bottom of the shroud basket whereby to place the mesh under tension, a removable handle on the mesh basket, a rod within the mesh basket extending between and carried by said handle and the bottom of the mesh basket, and magnets carried by said rod.

4. A bucket type strainer unit including an outer perforated shroud basket, a removable mesh basket within said shroud basket, a supporting collar at the top of the mesh basket adapted to seat on the shroud basket, a plate closing the bottom of the mesh basket, a stem projecting from said plate toward the bottom of the shroud basket, and means adapted to pull on said stem to draw the bottom plate of the mesh basket toward the bottom of the shroud basket whereby to place the mesh under tension.

5. A bucket type strainer unit including an outer perforated shroud basket, a removable mesh basket within said shroud basket, a supporting collar at the top of the mesh basket adapted to seat on the shroud basket, a plate closing the bottom of the mesh basket, a stem projecting from said plate toward the bottom of the shroud basket, and means adapted to pull on said stem to draw the bottom plate of the mesh basket toward the bottom of the shroud basket whereby to place the mesh under tension, together with a positioning pin extending between and cooperating with the bottom plate of the mesh basket and the bottom of the shroud basket to prevent rotation of the mesh basket within the shroud basket.

6. A mesh basket adapted for insertion in the shroud basket of a bucket type strainer, said mesh basket having a shroud engaging collar at its open end, a plate closing its opposite end, and a tensioning stem projecting from said plate, together with a bail-like handle connected to the shroud engaging collar, a rod within the mesh basket extending between and carried by said handle and said closure plate, and magnets carried by said rod.

7. A bucket type strainer comprising a strainer compartment having an open top, an inwardly projecting bucket supporting shoulder, a perforated bucket shroud having a flange adapted to seat on said shoulder, a mesh basket within the shroud basket and having a collar at its open end adapted to seat on said shroud, means for detachably connecting the bottom of the mesh basket to the bottom of the shroud, a handle on the collar of the mesh basket, and a lid for the compartment opening, said lid when in closed position being adapted to press on the handle whereby the mesh basket and its shroud are urged into the compartment so as to tightly seat the shroud flange on said bucket supporting shoulder.

8. A strainer unit of the bucket-type including in combination, a perforated shroud basket, a removable mesh basket within and closely fitting the interior of said shroud basket, means securing said baskets together, a removable bail of flat spring metal having outwardly turned ends, and cooperating flat slots at the top of the bucket into which said outwardly turned ends are adapted to project whereby the bail is maintained in its upright position.

9. The structure of claim 8 wherein the bail is provided at its top with a bow-like thrust transmitting member.

10. A strainer unit of the bucket type, including in combination, a perforated shroud basket, a mesh basket within and closely fitting the interior of said shroud basket, a supporting collar at the top of the mesh basket adapted to seat on the shroud basket, means for securing the bottom of the mesh basket to the bottom of the shroud basket, a removable bail of flat spring metal having outwardly turned ends, and cooperating flat slots at the top of the mesh basket into which said outwardly turned ends are adapted to project whereby the bail is maintained in its upright position.

11. The structure of claim 10 wherein the bail is provided at its top with a bow-like thrust transmitting member.

12. A mesh basket adapted for insertion in the shroud basket of a bucket type strainer, said mesh basket having a shroud engaging collar at its open end, a removable bail of flat spring metal having outwardly turned ends, and cooperating flat slots in the shroud engaging collar into which said outwardly turned ends are adapted to project.

13. The structure of claim 12 wherein the bail is provided at its top with a bow-like thrust transmitting member.

14. A bucket-type strainer comprising a perforated shroud basket, a removable mesh basket within the shroud basket, means securing said baskets together, a removable bail of flat spring metal having outwardly turned ends, cooperating flat slots at the top of the bucket into which said outwardly turned ends are adapted to project, a rod within the mesh basket extending between and carried by said bail and the bottom of the mesh basket, and magnets carried by said rod.

15. A bucket-type strainer including an outer perforated shroud basket, a removable mesh basket within and closely fitting the interior of the shroud basket, means for supporting the upper portion of the mesh basket on the upper portion of the shroud basket, and means for detachably connecting the bottom of the mesh basket to the bottom of the shroud basket including means for moving the bottom of the mesh basket toward the bottom of the shroud basket whereby to place the mesh under tension.

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