United States Patent

Carr

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[54] AUTOMATIC SELF-CLEANING STRAINERS

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[52] **U.S. Cl.** **210/333**, 210/413

[51] **Int. Cl.** **B01d 25/38**, B01d 29/24

[58] **Field of Search** 210/333, 413, 414, 415

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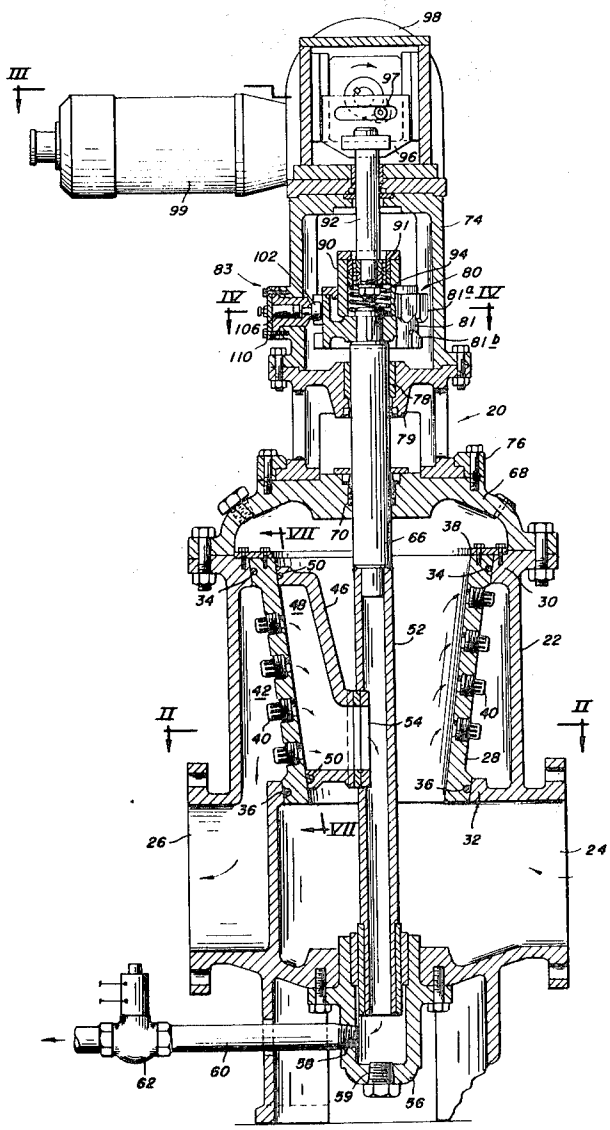
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[57] **ABSTRACT**

An automatic self-cleaning strainer including a housing having a liquid inlet and outlet, a strainer drum having straining media in the periphery thereof, a backwash shoe arranged to normally engage the surface of the shoe exposed to the liquid inlet, and indexing means for intermittently effecting relative rotation between the shoe and drum in increments of arc about the axis of the drum and also effecting radial separation between the shoe and drum during incremental movement therebetween and reestablishing engagement of the shoe with the surface of the drum when such incremental movement has stopped.

20 Claims, 10 Drawing Figures



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SHEET 1 OF 3

FIG. 1

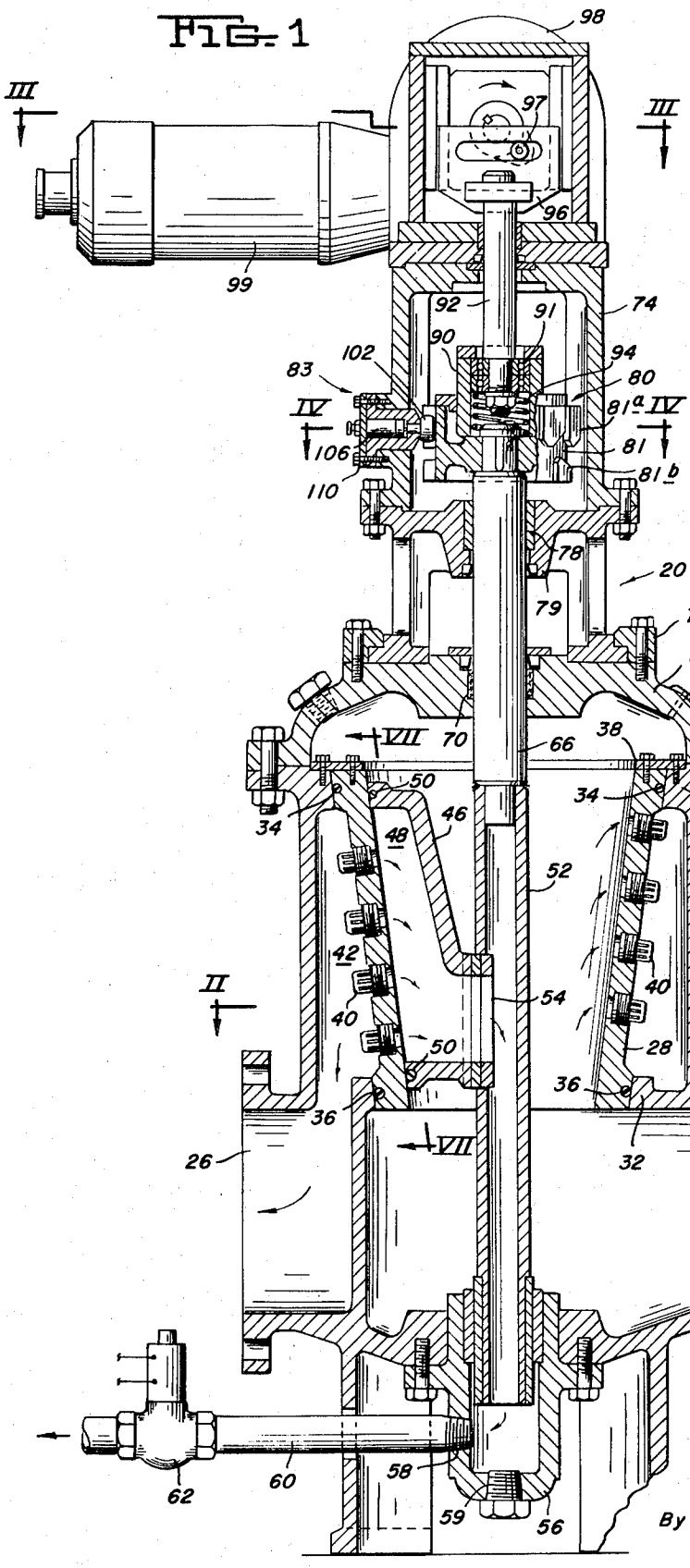
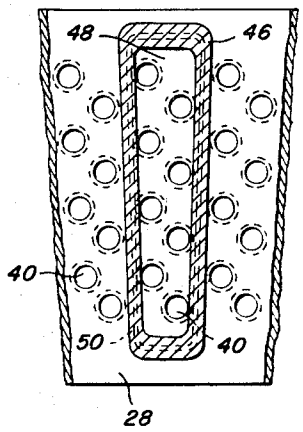


FIG. 7



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FIG. 2

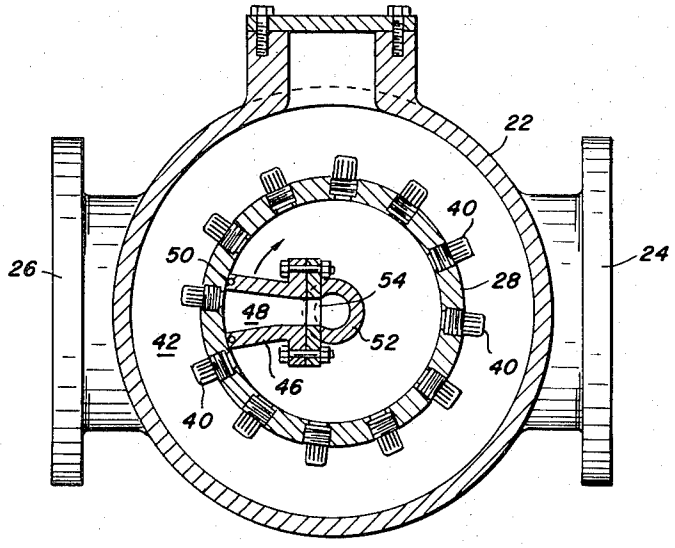


FIG. 4

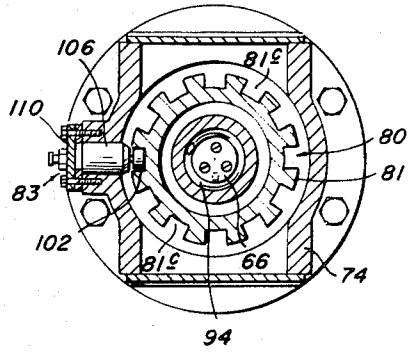


FIG. 3

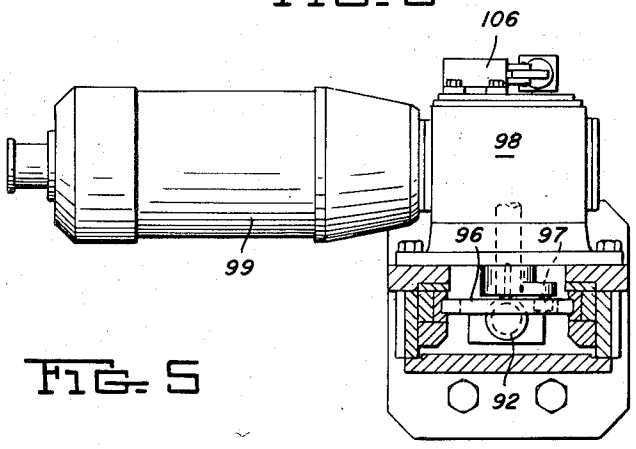


FIG. 5

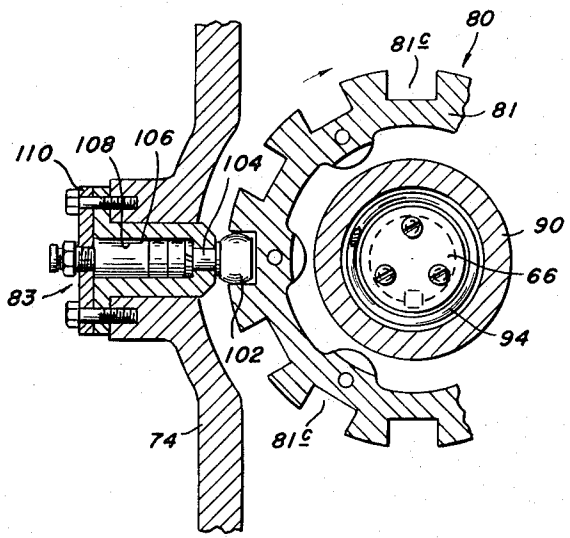
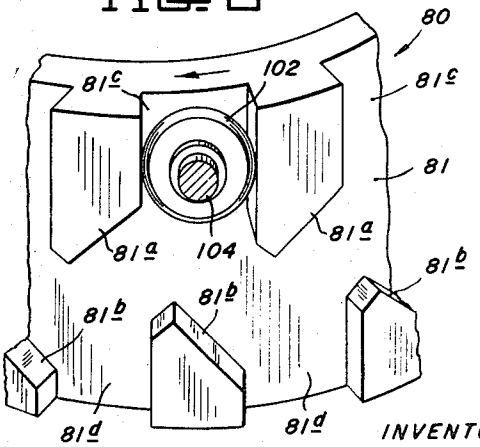


FIG. 6



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FIG. 8

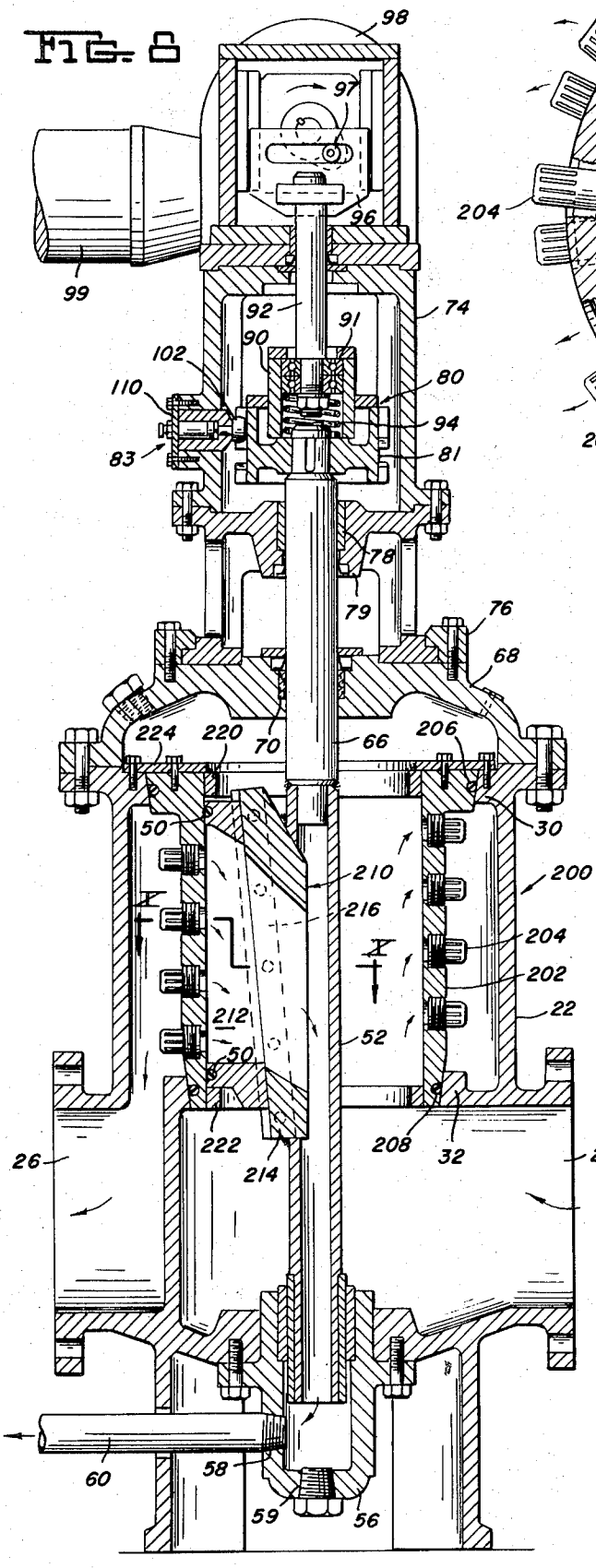


FIG. 10

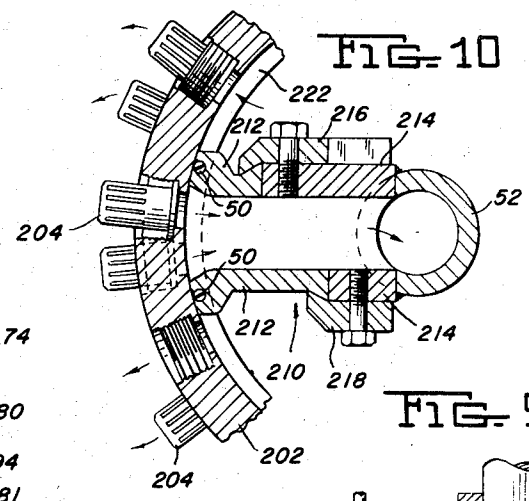
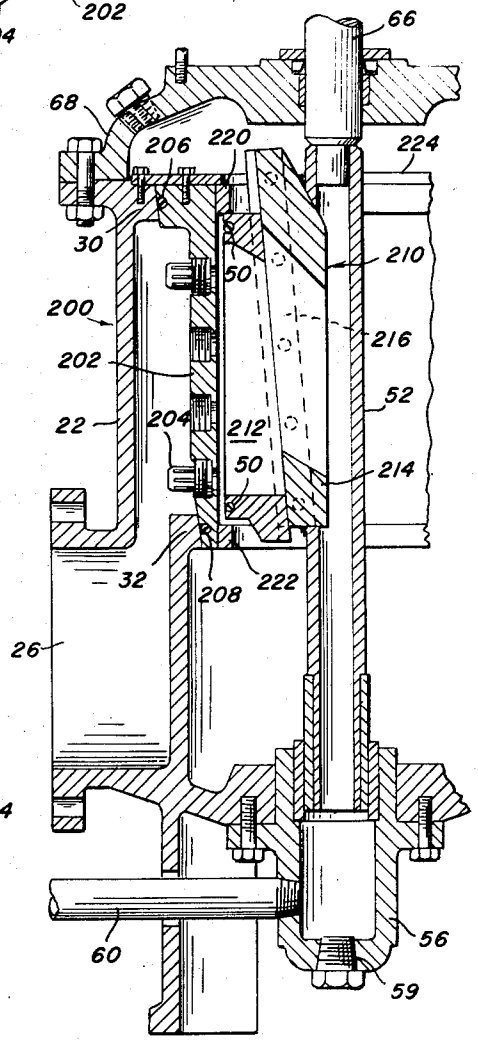


FIG. 9



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AUTOMATIC SELF-CLEANING STRAINERS

SPECIFICATION

This invention relates to an automatic self-cleaning strainer, and particularly to such a strainer having features making it suitable for use in the fine straining (e.g., 250 to 10 microns) of liquids. The commonly used automatic self-cleaning strainers incorporate a drum having straining media supported by it, through which dirty liquid flows to be strained of solid matter. The straining media is flushed of accumulated solid by liquid flowing in a reverse direction through the media and into a backwash shoe and out of the strainer. The drum and the shoe are rotated relative to each other so that successive sections of straining media are flushed. These type strainers are inherently limited, for all practical purposes, in size of solid matter which may be strained. For example, these strainers would not be used to remove solid matter less than 0.010 inch in cross-sectional size. Where it is desired to strain finer solids from the liquid, an additional fine strainer would have to be used.

In the case of a self-cleaning strainer having a rotating drum, the particle size limitation is controlled by the minimum clearance which can be maintained between the drum and the fixed strainer housing. The dirty incoming liquid will tend to pass through the interface of the drum and housing (i.e., short circuit) when the clearance there is greater than the size of the straining media or when the media has some solid accumulated thereon. Thus, liquid having fine particles will mix with outlet liquid. The short-circuiting problem increases with age of the strainer. The rotating drum will wear the housing, the drum will get out of round, and the housing casting will grow, with all of these resulting in an increase of the clearance between the drum and the housing.

Another problem with the currently used automatic self-cleaning strainers is the reduction of backwash efficiency caused by the opening up of clearances between the drum and backwash shoe. This problem is common to rotating or stationary drum type strainers. Dirty liquid will pass through the shoe-drum clearance to flood the shoe. This will reduce the amount of backwash liquid which can pass through the straining media. The backwash efficiency will thereby be reduced. The clearance between the backwash shoe and drum will get larger in time because of the constant rubbing between the shoe and drum, and thus, the backwash efficiency will diminish accordingly.

I overcome the above-metioned problems by providing an automatic self-cleaning strainer in which tight clearances between the drum and housing, and between the drum and backwash shoe are initially made and maintained in time. Thus, a short circuiting is greatly reduced to allow finer straining and improved backwashing efficiency. More particularly, I provide an automatic self-cleaning strainer which includes a backwash shoe normally engaging that surface of the drum which is exposed to inlet liquid, and indexing means for intermittently effecting relative rotation between the shoe and drum in increments of arc about the axis of the drum and also effecting radial separation between the shoe and drums during the relative rotation therebetween and reestablishing engagement of the shoe with the surface of the drum when such incremental relative rotation has stopped. By separating the shoe and drum when they rotate relative to each other, tight initial clearance between the shoe and drum will be maintained because there will be no rotational rubbing between the two elements. As a secondary feature, I provide means for always urging the shoe against the surface of the drum, to thus insure continuing tight clearance between the shoe and the drum. In the preferred form, the invention has a drum fixed to the strainer housing and a backwash shoe normally engaging the inside surface of the drum. The dirty liquid flows through the inside of the drum. The fixed drum will permit initial installation with tight clearance between the drum and the strainer housing. In addition, seals can be incorporated between the drum and strainer housing. Thus, short circuiting between the drum and strainer housing may be practically eliminated and thereby permit the strainer to be used for fine straining. The backwash shoe disengages from the drum when the shoe is moved relative to the drum and thereby results in continuing high backwash efficiency.

Other details and advantages of the invention will become apparent as the following descriptions of present preferred embodiments thereof proceed.

In the accompanying drawings I have shown present preferred embodiments of the invention in which:

FIG. 1 is a view partly in vertical section and partly in elevation of an automatic self-cleaning strainer constructed in accordance with this invention;

FIG. 2 is a view looking along the line II—II of FIG. 1;

FIG. 3 is a view looking along the line III—III of FIG. 1;

FIG. 4 is a view looking along the line IV—IV of FIG. 1;

FIG. 5 is a fragmentary section on a larger scale of the view shown in FIG. 4;

FIG. 6 is a fragmentary perspective view of the index wheel and guide roll forming part of this invention and shown in FIG. 5;

FIG. 7 is a view looking along the line VII VII of FIG. 1 showing one section of straining media as arranged in the drum element of this invention;

FIG. 8 is a view partly in vertical section and partly in elevation of an automatic self-cleaning strainer constructed in accordance with this invention and showing another embodiment thereof;

FIG. 9 is a fragmentary section of the strainer of FIG. 8 showing relationship of the elements of the backwash shoe assembly to the strainer drum, and specifically showing the front shoe separated from the inner surface of the drum; and

FIG. 10 is a view looking along the line X—X of FIG. 8.

Referring now to the drawings, there is shown an automatic self-cleaning strainer, generally designated by the numeral 20, including a generally cylindrical-shaped housing or body 22 having diametrically opposed liquid inlet 24 and outlet 26 openings. Arranged coaxially within body 22 is a truncated cone-shaped strainer drum 28 with its narrow and facing downwardly. The drum 28 is fixed between flange portions 30 and 32 depending from the main portion of body 22. O-ring type seals 34 and 36 of suitable rubber material, are arranged between the upper and lower circumferential edge of drum 28 and flange portions 30 and 32, respectively. An annular keeper plate 38 bolted to the upper flange 30 and the top of drum 28 serves to secure the drum within body 22. Drum 28 is provided with a multiplicity of regularly spaced openings therethrough for removably receiving straining media 40. The straining media 40 preferably used with this invention, would be the kind capable of fine straining, that is, capable of straining solid matter having a size of anywhere from 250 microns to 10 microns. Straining media of wire mesh, perforated metal, nylon, or sintered metal, for example, would satisfy the fine-straining requirement. As shown in FIG. 7, the openings through drum 28 are arranged in regular vertical sections so that the backwash shoe opening, as will be more fully described hereinafter, will register with or surround a complete section of openings without any overlap by the shoe of openings in the adjacent sections of drum openings.

The interior of body 22 is provided with a structure which serves to guide dirty liquid from inlet 24 to the interior of drum 28 where the liquid will pass through the straining media 40 into cavity 42 surrounding the drum 28 and then to outlet 26.

The straining media 40 are flushed clean by water flowing from cavity 42 in a reverse direction into a backwash shoe 46 disposed on the interior of drum 28. Backwash shoe 46 includes a hollow body having a large mouth portion 48 shaped to surround one section of openings through drum 28, as was mentioned previously. The mouth portion of backwash shoe 46 also has a tapered profile to conform with the interior surface of drum 28 so that the mouth portion engages the interior surface of the drum. An O-ring type seal ring 50 is arranged

around the surface of the mouth portion 48 of backwash shoe 46 and serves to seal the interior of the shoe from the interior of the drum 28. The backwash shoe 46 is fixed to an intermediate portion of an elongated tube 52 arranged coaxially with drum 28. Backwash shoe 46 has a discharge opening 54 communicating with the interior of tube 52. Tube 52 has its lower end reciprocally-slidably and rotatably arranged in the upper end portion of a backwash manifold 56 bolted to the lower end portion of body 22. Backwash manifold 56 is hollow and includes a backwash liquid outlet 58 and a drain hole 59 which is suitably plugged. Backwash outlet 58 may be connected with piping 60, leading to a backwash liquid strainer open to atmosphere or whatever, as desired. A shutoff valve 62 of any well-known construction is placed in the piping 60 for opening and closing the backwash liquid flow. By virtue of the arrangement of tube 52, backwash manifold 56 and piping 60, just described, backwash shoe 46 is open to atmosphere and thus pressurized liquid in cavity 42 will flow through the section of straining media 40 exposed to the backwash shoe, providing, of course, that valve 62 is open.

The upper end of tube 52 is fixed to a solid shaft 66 which extends upwardly through a central opening of a cover 68 removably fixed to the top end portion of body 22. Shaft 66 is suitably reciprocally-slidably and rotatably arranged within the central opening of cover 68, which opening also houses a packing assembly 70 surrounding the shaft. Shaft 66 extends upwardly into the confines of indexing assembly housing 74 arranged on the top surface of cover 68. The housing 74 is secured to cover 68 by an adjusting ring 76 which may be loosened to permit the housing 74 to be rotated relative to body 22 for aligning the mouth portion 48 of backwash shoe 46 with a section of straining media 40. Such an aligning is necessary to get proper indexing of backwash shoe 46 with successive sections of media as the shoe is moved incrementally around drum 28. This indexing will be more fully appreciated as this description progresses.

The upper end portion of shaft 66 is reciprocally slidably and rotatably supported by a bearing member 78 arranged in a bearing housing 79 depending from the main section of indexing housing 74. The upper end of shaft 66 is fixed to the hub portion of index wheel 81 forming the cam portion of the indexing means which is part of this invention and is generally designated by the reference numeral 80. The indexing wheel 81 is fixed at its upper end to a spring housing 90. Ball bearings 91 are supported in the upper section of spring housing 90, and a drive shaft 92 is journaled in the bearings. A helical coil spring 94 in compression is arranged in spring housing 90 between bearings 91 and the hub of index wheel 81 to urge a downwardly directed force on the indexing wheel. This force is transmitted to shaft 66, to tube 52, and ultimately to backwash shoe 46. The spring 94 thus serves as a pressure means for urging the backwash shoe 46 against the interior surface of drum 28.

The upper end of drive shaft 92 is coupled to a slotted plate member 96 which is slidably arranged for reciprocal upward and downward movement. The slotted plate member 96 is operatively arranged with a drive roller 97 which in turn is coupled to drive gears housed in gear unit 98 coupled to electric motor 99 connected to a source of electrical power, not shown. The arrangement of the drive assembly comprising the plate member 96, drive roller 97, drive gear unit 98 and 99, just described, is a well-known arrangement for imparting reciprocal movement to the drive shaft 92 which reciprocal movement is transmitted to the spring housing 90, index wheel 81, shaft 66, tube 52 and backwash shoe 46.

The indexing assembly 80 includes the index wheel 81 and guide assembly 83 fixed to an intermediate portion of indexing assembly housing 74. The indexing assembly 80 serves to guide the shaft 66, tube 52, and backwash shoe 46 in the reciprocal upward and downward movement, and also rotatably in incremental arcs whereby the backwash shoe is positioned around the interior of drum 28. Index wheel 81 as shown in FIGS. 4–6, is formed with a series of longitudinally extending circumferentially spaced upper and lower bevel-ended teeth 81*a* and 81*b*, respectively. Upper and lower slots 81*c* and 81*d*, respectively, are defined between the upper and lower teeth. The lower teeth 81*b* are longitudinally aligned with the upper slots 81*c*, while the upper teeth 81*a* and lower slots 81*d* are longitudinally aligned. The guide assembly 83 includes a guide roll 102 rotatably mounted on a shaft 104 fixedly arranged in a cartridge 106 received in an opening 108 through indexing assembly housing 74. Cartridge 106 is secured in place by cover 110 which is removably fixed to housing 74. Guide roll 102 is sized to be snugly received in slots 81*c* and 81*d*.

When it is desired to backwash the straining media 40, the valve 62 in piping 60 is opened and liquid from cavity 42 flows freely in the reverse direction through the straining media into backwash shoe 46, then out of the backwash manifold 56. The backwashing sequence may be timed and controlled by coupling the backwash valve 62 with the operation of motor 99 in any well-known manner. Thus, when the backwash shoe 46 is to be repositioned between successive sections of straining media 40, the control will close valve 62 and start motor 99. Drive shaft 92 will first lift index wheel 81 and a slot 81*c* will move upwardly of guide roll 102 until a lower tooth 81*b* engages the roll. At this point the backwash shoe 46 is disengaged or separated from the interior surface of the drum 28. The separation of the backwash shoe 46 from the drum 28 results because the shoe moves straight up and will thus separate sine it is shaped to the contour of the interior surface of the drum. When the beveled end of the lower tooth 81*b* engages the guide roll 102, a force is imparted to the guide wheel 81 to rotate it an incremental amount in the clockwise direction, or left as viewed in FIG. 6. A lower slot 81*d* will receive guide roll 102 at which point the drive shaft 92 is driven reciprocally downwardly. Lower slot 81*d* is guided around guide roll 102 until the beveled end of an upper tooth 81*a* engages the roll and a force is imparted to the tooth to rotate the guide wheel 81 another incremental amount in the clockwise direction. An upper slot 81*c* now receives guide roll 102 as the downward reciprocal movement of the guide wheel 81 continues. A limit switch 106 will effect stoppage of the motor 99 when the lower limit of movement of the drive shaft 92 is reached. Thus, by virtue of the reciprocal-incremental rotational movement just described, the backwash shoe 46 will move upwardly out of engagement with the drum 28, rotate an incremental amount in a clockwise direction, move slightly downwardly, rotate another incremental amount in a clockwise direction and then move downwardly to again engage the drum 28. The index assembly 80 is so designed that the backwash shoe 46 is guided from section to section, successively, of straining media 40. The urging of spring 94 will provide a tight reengagement of backwash shoe 46 with drum 28.

When the backwash valve 62 is closed during repositioning of the backwash shoe 46, the hydraulic pressure in the backwash manifold 56 would substantially equal the pressure in cavity 42. This pressure would develop an upward thrust on the cross-sectional area of shaft 66, which could possibly prevent proper reengagement of the backwash shoe 46 with drum 28. To avoid this possibility, the backwash valve 62 should be opened during the downstroke of the backwash shoe 46.

As mentioned earlier, the proper indexing of backwash shoe 46 between successive sections of straining media 40 is provided by making the indexing assembly housing 74 rotatably adjustable with respect to body 22. Thus, the housing 74 would be rotated so that the opening of the mouth portion 48 of backwash shoe 46 completely surrounds a section of straining media 40. Adjusting ring 76 would then be tightened to secure housing 74 to cover 68.

Since the drum 28 is fixed relative to the body 22, a very tight sealed fit is capable between the drum and the body. Because of this, an inlet 24 may be effectively sealed from the cavity 42, thus avoiding short circuiting of dirty inlet liquid

into the outlet cavity. As pointed out earlier, short circuiting would occur where the mesh size of the strainer media was less than the clearance between the drum 28 and body 22, and this short circuiting would, accordingly, limit the minimum size particle which could be strained. By virtue of the tight fit between the drum and body, this invention is particularly adaptable to fine straining. In addition, backwashing of the straining media is improved by this invention because of the tight engagement between backwash shoe 46 and drum 28, which engagement is maintained because surface wear of the shoe is minimized since it is disengaged from the drum during repositioning of the shoe on the drum. Backwash efficiency is also improved by arranging the straining media 40 in sections, as described, enabling the backwash shoe to completely surround a section of media without any overlap of adjacent sections by the shoe. This surrounding arrangement will avoid flooding of the backwash shoe 46, and thus improve backwash efficiency.

Another embodiment of the present invention is illustrated in FIGS. 8–10. The strainer of FIGS. 8–10 is generally designated by numeral 200 and includes many of the same elements described and illustrated with regard to the first embodiments. Some of the same elements will not be described again with the understanding that they form part of this second embodiment. Strainer 200 includes a drum 202 of generally cylindrical cross section provided with a multiplicity of regular openings therethrough for removably receiving straining media 204. The openings through drum 202 are put in patterns similar to the uniform pattern of drum 28 so that when the backwash shoe assembly of this embodiment is incrementally moved, a complete section of openings is surrounded by the backwash shoe. Drum 202 is fixed between flange portions 30 and 32 depending from the main portion of body 22. O-ring seals 206 and 208 of suitable rubber material are arranged between the upper and lower circumferential edges of drum 202 and flange portions 30 and 32, respectively.

A backwash shoe assembly, generally designated by the numeral 210, is fixed to an intermediate section of hollow tube 52, and includes a front shoe 212 in engagement with the inner surface of drum 202 and a rear shoe 214 fixed at its radial inner end to the tube 52 and slidably secured at its radial outer end with the radial inner end of front shoe 212. The mating surfaces of the front shoe 212 and rear shoe 214 are inclined towards the tube 52. The front shoe 212 and rear shoe 214 are secured to each other by means of plate 216 bolted to one side of rear shoe 214 and overlapping the inner edge portion of the front shoe, and plate 218 bolted to the other side of rear shoe 214 and overlapping the other inner edge of the front shoe.

Rings 220 and 222 are disposed in the inner portions of the upper and lower ends, respectively, of drum 202. Upper ring 220 is fixed to an annular plate 224 which in turn is fixed to the upper end surfaces of drum 202 and flange 30. The lower ring 222 is fixed in position as by welding it to the drum 202. The rings 220 and 222 serve as upper and lower stops for the reciprocal movement of the front shoe 212. As the tube 52 is lifted in the manner described with regard to the first embodiment, both the front shoe 212 and rear shoe 214 are lifted together. A slight clearance (viz, one-eighth inch) exists between the top of the front shoe 212 and the lower surface of the upper ring 220, and as the front shoe 212 is lifted to contact ring 220 further upward movement of the front shoe is stopped. Rear shoe 214 continues moving upwardly with the resultant action between the inclined mating surfaces of the front and rear shoes causing the front shoe 212 to separate from engagement with the inner surface of drum 202. Rotation of both front and rear shoes 212 and 214 will result, followed by downward translation of the rear shoe 214, then the additional incremental rotation of both front and rear shoe, and finally downward translation of both front and rear shoes where front shoe 212 is stopped by lower ring 222 at which point rear shoe 214 urges front shoe 212 against the inner surface of the drum 202.

The embodiment of strainer 200 of FIGS. 8–10 functions the same as the embodiment of FIGS. 1–7 and with the same results set forth with respect to the first embodiment. It is again noted that the only difference between the first and second embodiment is in the construction of the drums and backwash shoe assemblies.

Many other modifications are contemplated within the scope of the essence of this invention. The drum could be made to rotate incrementally with the backwash shoe having been disengaged prior to rotation, and then engaged when rotation is stopped. Although the incrementally rotating drum would not be as good as the stationary drum regarding sealing between the inlet and the outlet, it would be considerably better than a constantly rotating drum, as is commonly used. The electrical motor 99 could be replaced by either a pneumatic or hydraulic motor. The timing between operation of the motors (i.e., the duration of backwash) may be simply controlled by a timing mechanism, a flow switch in the backwash outlet, a pressure drop controller arranged between inlet 24 and outlet 26, or by any other well-known controllers. It should be apparent that even other modifications and embodiments are possible within the scope of this invention as set forth in the following claims.

I claim:

1. An automatic self-cleaning strainer comprising:
a housing having inlet and outlet means,
strainer drum means supported in said housing and having straining media in the periphery thereof, said drum means being so arranged that liquid entering the inlet means flows through said media to the outlet means;
backwash shoe means arranged within said housing and normally engaged against that surface of said drum means which is exposed to the inlet liquid and into which strained liquid backwashes through a selected area of said drum means to flush solids therefrom;
indexing means for intermittently effecting relative rotation between said shoe and drum means in increments of arc about the axis of the drum means and effecting radial separation between the shoe and drum means during the incremental relative rotation therebetween and reestablishing engagement of the shoe means with the surface of the drum means when such incremental relative rotation has stopped.

2. The automatic self-cleaning strainer as set forth in claim 1 wherein said straining media include individual strainer elements carried by said drum means; and said indexing means being indexed with respect to the location of straining elements in the drum means and the dimensions of said backwash shoe means being such that only the full areas of said strainer elements register with the shoe means any time the shoe means is engaged with the drum means.

3. The automatic self-cleaning strainer as set forth in claim 1 wherein the interior of said drum means communicates with said inlet means and the exterior of said drum means communicates with said outlet means; said backwash shoe means is arranged to engage the interior surface of said drum means.

4. The automatic self-cleaning strainer as set forth in claim 1 wherein said drum means is fixed to said housing; and said backwash shoe means is rotatable with respect to said drum means.

5. The automatic self-cleaning strainer as set forth in claim 1 wherein said indexing means includes locking means for securing said backwash shoe means in engagement with said drum means between incremental relative rotation therebetween.

6. An automatic self-cleaning strainer, comprising:
a hollow housing having liquid inlet and outlet means;
strainer drum means supported in said housing and having straining media secure in openings extending therethrough, the interior of said drum means communicating with said inlet means and the exterior of said drum means communicating with said outlet means;
backwash shoe means arranged within said housing and normally sealably engaging an interior portion of said drum

means and covering a section of straining media for receiving backwash liquid flowing through such section of media from the exterior of said drum means and for discharging the backwash liquid from said housing; and

indexing means supported by said housing and fixed to said shoe means for intermittently positioning said shoe means about the inner periphery of said drum means and effecting separation of the shoe means from the drum means during the repositioning thereof about said drum means and reestablishing engagement of the shoe means with the drum means when such repositioning is completed.

7. The automatic self-cleaning strainer as set forth in claim 6 wherein said indexing means is so constructed and arranged as to reciprocate said shoe means into and out of engagement with said drum means and to rotate said shoe means between disengaged positions thereof with respect to said drum means.

8. The automatic self-cleaning strainer as set forth in claim 6 including pressure means for urging said shoe means into engagement with said drum means.

9. The automatic self-cleaning strainer as set forth in claim 6 wherein said indexing means includes a cam and cam follower operatively engaging each other for guiding said shoe means out of and into engagement with said drum means during repositioning of said shoe means about said drum means.

10. The automatic self-cleaning strainer as set forth in claim 6 wherein said openings in said drum means are arranged in a pattern of successive like sections; and wherein said shoe means is shaped such that an entire one of said sections is surrounded without any overlap of adjacent sections by said shoe means when same is in engagement with said drum means.

11. The automatic self-cleaning strainer as set forth in claim 10 including aligning means operative with said indexing means for aligning said shoe means with a section of said openings.

12. The automatic self-cleaning strainer as set forth in claim 10 wherein said indexing means includes a cam and cam follower operatively engaging each other for guiding said shoe means from engagement with said drum means and surrounding a section of openings to disengagement from said drum means and then into engagement with said drum means to surround a next-successive section of openings.

13. An automatic self-cleaning strainer, comprising:

a hollow housing having liquid inlet and outlet means;

a truncated cone-shaped strainer drum means supported in said housing and having a plurality of straining media secured in circumferentially spaced openings extending therethrough, the interior of said drum means communicating with said inlet means and the exterior of said drum communicating with said outlet means;

backwash shoe means arranged within said housing and sealably engaging an interior portion of said drum means and covering a section of straining media for receiving backwash liquid flowing through such section of media from the exterior of said drum means and for discharging the backwash liquid from said housing; and

indexing means supported by said housing and fixed to said shoe means for selectively positioning said shoe means about the inner periphery of said drum means, said indexing means including cam and cam follower means operatively engaging each other for guiding said shoe means reciprocally into and out of engagement with said drum means and rotatably between disengaged positions of said shoe means.

14. The automatic self-cleaning strainer as set forth in claim 13 including pressure means for urging said shoe means into engagement with said drum means.

15. The automatic self-cleaning strainer as set forth in claim 13 wherein said openings in said drum means are arranged in a pattern of successive like sections; and wherein said shoe means is shaped such that an entire one of said sections is surrounded without any overlap of adjacent sections by said shoe means when same is in engagement with said drum means.

16. The automatic self-cleaning strainer as set forth in claim 15 wherein said cam and cam follower means are so constructed and arranged such that said shoe means is guided from engagement with said drum means reciprocally towards the wide end of the drum means and then rotatably into alignment with the next section of openings and then reciprocally into engagement with the drum means.

17. An automatic self-cleaning strainer, comprising:

a hollow housing having liquid inlet and outlet means;

a generally cylindrically shaped strainer drum means supported in said housing and having a plurality of straining media secured in circumferentially spaced openings extending therethrough, the interior of said drum means communicating with said inlet means and the exterior of said drum communicating with said outlet means;

backwash shoe means arranged within said housing and sealably engaging an interior portion of said drum means and covering a section of straining media for receiving backwash liquid flowing through such section of media from the exterior of said drum means and for discharging the backwash liquid from said housing;

said backwash shoe means including a front shoe having an outer end portion normally engaging the interior surface of said drum means and an inner end inclined toward the axis of the drum means, a rear shoe slidably engaging and secured to said front shoe along the inner end thereof, and a hollow tube coaxial with said drum means supporting said rear shoe and communicating with the interior of said rear shoe and further communicating with the exterior of said housing;

first and second stop means supported at opposite ends, respectively, of said drum means for limiting the axial movement of said front shoe with respect to said drum means;

indexing means supported by said housing and fixed to said backwash shoe means for selectively positioning said shoe means about the inner periphery of said drum means, said indexing means operatively engaging said tube to move same reciprocally with respect to said drum means whereby said front shoe is stopped by said first stop means and said rear shoe continues to reciprocate to move said front shoe out of engagement with said drum means and then rotatably into a next successive position where said tube is then moved reciprocally in the opposite direction where said front shoe is stopped by said second stop means and said rear shoe continues to reciprocate to move said front shoe into engagement with said drum means.

18. The automatic self-cleaning strainer as set forth in claim 17 including pressure means for urging said shoe means into and out of engagement with said drum means.

19. The automatic self-cleaning strainer as set forth in claim 17 wherein said openings in said drum means are arranged in a pattern of successive like sections; and wherein said front shoe is shaped such that an entire one of said sections is surrounded without any overlap of adjacent sections by said front shoe when same is in engagement with said drum means.

20. The automatic self-cleaning strainer as set forth in claim 17 wherein said first and second stop means include ring members fixed at opposite end portions of said drum means.

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