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(54) Benævnelse: **DREJESKIVEFILTER MED RETURSKYLNINGSFØRINGER**

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DESCRIPTION

Description

FIELD OF THE INVENTION

[0001] The present invention relates to rotary disc filters that filter water or wastewater.

BACKGROUND OF THE INVENTION

[0002] Rotary disc filters are designed to filter a liquid, such as water or wastewater, and typically include a drum, a plurality of filter discs secured to the drum, and a backwash system for backwashing filter media forming a part of the filter disc. Liquid to be filtered passes from the drum into the filter disc, which includes the filter media on opposite sides thereof. Liquid in the filter disc flows outwardly through the filter media. In this process, suspended solids in the liquid are captured or retained on the inner surfaces of the filter media. From time-to-time, the filter media is cleaned by a backwashing operation. In the backwashing operation, nozzles disposed exteriorly of the filter disc direct a pressurized backwash through the filter media and into the filter disc. The backwash dislodges the suspended solids retained on the inner surfaces of the filter media. The mixture of backwash and dislodged suspended solids flow by gravity from the filter disc, through openings in the drum, and into a solids trough disposed in the drum.

[0003] KR 101039326, KR 101339328, and EP 2514500 relate to rotary disc filters and generally describe various conventional features of disc filters. In particular, these references disclose a disc filter for filtering a liquid that comprises a rotary drum for receiving the liquid, and a solids trough that is disposed in the drum that receives a backwash and suspended solids mixture. Moreover, the rotary filter disc includes a series of filter discs where each filter disc comprises a filter frame and filter media on opposite sides of the frame. A drive is provided for rotatively driving the drum and causing the filter disc to rotate with the drum. These rotary disc filters typically are provided with a backwash system for backwashing the filter media, the backwash system including a plurality of nozzles disposed exteriorly of the filter disc and configured to direct backwash through the filter media into the filter disc.

[0004] It is challenging, however, to channel all or substantially all of the suspended solids into the solids trough. An accumulation of suspended solids takes place inside the drum and inside the filter disc. Particles of all sizes accumulate in these areas. The reasons for this accumulation are many. A main reason is that 100% of the solids filtered by the filter media do

not end up in the solids trough. Some of the solids fall off the media when breaking through the water surface when the drum and filter disc are rotated in a backwashing operation. Other suspended solids fail to reach the solids trough due to a high incoming water speed or a high rotation speed of the filter disc during backwashing. Further, some of the suspended solids captured or retained on the filter media do not end up in the solids trough. All of this tends to result in an inefficient filtering process.

[0005] Therefore, there has been and continues to be a need for a rotary disc filter that is designed to more efficiently collect suspended solids and direct them into the solids trough.

SUMMARY OF THE INVENTION

[0006] The present invention is defined by the appended independent claims. Further detailed embodiments are defined in the dependent claims.

[0007] The present invention entails a rotary disc filter having backwash guides that are designed to guide a backwash and suspended solids mixture through the filter disc and through openings in the inner periphery of the filter disc after which the backwash and suspended solids pass through openings in the drum and into the solids trough disposed in the drum.

[0008] In the present invention, the backwash guides project inwardly from opposite sides of the filter disc and are circumferentially spaced around the filter disc. Backwash guides and the filter media disposed on opposite sides of the filter disc form a series of backwash channels that extend generally between the inner and outer peripheries of the filter disc. Inner end portions of the backwash channels are disposed adjacent openings in the inner periphery of the filter disc. As the filter disc is rotated during the backwashing operation, the backwash channels tend to catch or receive the mixture of backwash and suspended solids and guide the mixture of backwash and suspended solids along the backwash channels and into the openings formed in the inner periphery of the filter disc. Thereafter, the backwash and suspended solids mixture pass through openings in the drum and into the solids trough disposed within the drum.

[0009] Other objects and advantages of the present invention will become apparent and obvious from a study of the following description and the accompanying drawings which are merely illustrative of such invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010]

Figure 1 is a cross-sectional view of a disc filter.

Figure 1A is an enlarged fragmentary view illustrating a portion of a filter disc that forms a part of the disc filter.

Figure 1B shows a portion of Figure 1A and identifies the location of dimension and angle indicators L, H and ϕ.

Figure 2 is a schematic cross-sectional view of a portion of the filter disc particularly illustrating the backwash guides.

Figure 3 is a perspective view of a filter frame module having the backwash guides incorporated therein.

Figure 4 is a perspective view of the disc filter with portions broken away to better illustrate certain components of the disc filter.

Figure 5 is a perspective view of a rear portion of the disc filter with portions broken away to better illustrate certain components of the disc filter.

Figure 6 is a fragmentary perspective view of a portion of the disc filter which illustrates how the backwash guides facilitate the removal of a backwash and suspended solids mixture from the filter disc.

DESCRIPTION OF EXEMPLARY EMBODIMENT

[0011] With further reference to the drawings and as discussed above, the present invention relates to a rotary disc filter 10 that is designed to effectively collect suspended solids in a solids trough 14. This is achieved by a series of backwash guides 12 provided in filter discs 16 mounted to a rotary drum 40. See Figures 1, 1A and 2. Each filter disc 16 comprises a filter frame 18 and filter segments 20 supported in the filter frame. Filter segments 20 form filter media disposed on opposite sides of the filter disc 16. See Figure 2. Backwash guides 12 are spaced inwardly from the filter segments 20. This spacing results in the backwash guides 12, filter frame and the filter segments 20 forming backwash channels 22 around the interior of the filter disc 16.

[0012] In a backwashing operation, the filter discs 16 and hence the backwash channels 22 are rotated past backwashing nozzles 32 that form a part of the backwashing system 30 and which are disposed on opposite sides of the filter discs 16. Pressurized backwash from the nozzles 32 penetrates the filter segments 20 and enters the filter discs 16, and in the process, suspended solids are dislodged from an inner side of the filter segments 20. Backwash that penetrates the filter segments 20 does not typically continue in the same direction once inside the filter disc 16. The velocity of the backwash on the inner side of the filter segment 20 is relatively low. The backwash which penetrates the filter media tends to run down, by gravity,

along the inner sides of the filter media. Expressed in another way, the backwash and suspended solids mixture tends to move by gravity closely adjacent the inner surfaces of the filter segments 20.

[0013] Backwash channels 22 include open sides that face the direction of rotation of the filter discs 16. As portions of the filter segments 20 move towards and past the backwashing nozzles 32, the backwash channels 22 tend to catch or scoop the mixture of backwash and suspended solids. Since a substantial portion of the backwash and suspended solids mixture moves adjacent the inner surfaces of the filter segments 20, this facilitates the efficient capture of the mixture. Due to the location of the nozzles 32 and the direction of rotation of the filter disc 16, as viewed for example in Figure 1, the backwash and suspended solids mixture tend to move towards and into oncoming backwash channels 22. Once in the backwash channels 22, the backwash and suspended solids mixture is guided inwardly to and through openings 18D formed in the inner periphery 18B of the filter frame 18. From there, the mixture of backwash and suspended solids passes through openings 40A in the drum 40 and into the solids trough 14 disposed in the drum.

[0014] Subsequently, the basic structure and function of the disc filter 10 will be described. But first, the focus is on the filter discs 16 and the backwash guides 12. Figures 1 and 1A show a filter disc 16 mounted to the rotary drum 40. Drum 40 includes an array of openings 40A formed in the surface thereof. Each filter disc 16 comprises a filter frame 18 and the filter segments 20 supported in the filter frame. In the embodiment shown in Figure 1, the filter frame 18 comprises a plurality of circumferentially spaced support arms 18A. Support arms 18A extend between an inner periphery 18B and an outer periphery 18C of the filter frame. Inner periphery 18B of the filter frame 18 also forms the inner periphery of the filter disc 16. Openings 18D are formed in the inner periphery of the filter disc 16. Openings 18D enable water or liquid to flow from the drum 40 into the filter discs 16 during the filtering process. They also allow a mixture of backwash and suspended solids to flow from the filter discs 16 through openings 40D in the drum 40 and into the solids trough 14 disposed in the drum. See Figure 1.

[0015] As noted above, in one embodiment during a backwashing operation, filter discs 16 rotates counterclockwise as viewed in Figure 1. Backwash guides 12 project from one side of the support arms 18A in the direction of rotation of the filter discs 16. Backwash guides 12 can be integrally formed with the filter frame 18 and particularly with the support arms 18A attached or fastened to a particular filter frame structure or integrally formed with the filter segment 20.

[0016] During a backwashing operation, the nozzles 32 are disposed exteriorly of the filter discs 16 and direct a pressurized backwash through the filter segments 20. In the process, suspended solids filtered by the filter segments 20 and retained on the inner side thereof are dislodged. This results in a mixture of backwash and suspended solids in the filter discs 16. The function of the backwash guides 12 and backwash channels 22 is to guide the mixture of backwash and suspended solids out of the filter discs 16 and into the solids trough 14.

[0017] To better illustrate the backwash guides 12 and how they facilitate the efficient capture

and removal of the backwash and suspended solids mixture, reference is made to Figure 2. Figure 2 is a schematic cross-sectional illustration showing a portion of the filter frame 18, filter segments 20 and the backwash guides 12. As noted above, filter frame 18 includes support arms 18A and they are schematically illustrated in Figure 2. Support arms 18A include an inner portion 18A1, an outer portion 18A2, and a cross portion 18A3. See Figure 2. Again, this is a schematic illustration and in one embodiment the transversely aligned support arms 18A shown in Figure 2 can be interconnected. In any event, the support arms 18A form back-to-back grooves that receive and hold seals 54. Filter segments 20 which include a surrounding frame and filter media are in turn received and held in the seals 54.

[0018] Continuing to refer to Figure 2, the backwash guides 12 project from one end of the inner portions 18A1. Again, the backwash guides 12 project in the direction of rotation of the filter discs 16 during backwashing as shown in Figures 1 and 2. Note that the backwash guides 12 also project inwardly into the filter disc 16. Further, the backwash guides 12 are circumferentially spaced around the filter disc 16. Backwash guides 12 are arranged in pairs. That is, two backwash guides 12 are transversely aligned and disposed across from each other. See Figure 2. The backwash guides 12 project slightly towards each other. This forms an open space 60 between each pair of backwash guides 12. This open space enables water or liquid to pass through the open space when the filter discs 16 are rotated.

[0019] Backwash guides 12 in one embodiment effectively form an elongated edge that extends between the inner and outer peripheries 18B and 18C of the filter frame 18. Further, the backwash guides 12, along with portions of the support arms 18A, seals 54 and filter segments 20 form the backwash channels 22. See Figure 2. During a backwashing operation, the backwash channels 22 effectively entrap a mixture of backwash and suspended solids and guide or direct the mixture to openings 18D formed in the inner periphery 18B of the filter frame 18. As noted before, this enables the backwash and suspended solids mixture to pass through the array of openings 40A in the drum 40 and into the underlying solids trough 14.

[0020] As noted above, during a backwashing operation, the drum 40 and the filter discs 16 can be rotated. Filter segments 20 are rotated to an upper position on the disc filter 10 where the nozzles 32 are stationed. As the backwash guides 12 approach the nozzles 32 and move past the nozzles, backwash from the nozzles 32 penetrate the filter segments 20 and enter the interior of the filter discs 16. When this happens, the backwash and dislodged suspended solids form a mixture. The backwash guides 12 tend to urge the backwash and suspended solids mixture into the backwash channels 22. The backwash guides 12 and the backwash channels 22 tend to catch or scoop the backwash and suspended solids mixture that ends up inside the filter disc 16. Once in the backwash channels 22, the backwash and suspended solids mixture is directed along the channels 22. Inner portions of the backwash channels 22 terminate adjacent the openings 18D in the inner periphery 18B of the filter frame or filter disc. Thus, the backwash channels 22 effectively guide or direct the backwash and suspended solids mixture into the openings 18D of the filter frame 18. From there, as discussed above, the backwash and suspended solid mixture passes through openings 40A in the drum 40 and into the solids trough 14.

[0021] In some embodiments, the filter frame 18 is modular and is constructed of interchangeable modules. The modules can be constructed of plastic or other suitable materials. With reference to Figure 3, there is shown therein one of the modules 80 employed in the filter frame 18 shown in Figure 1. In this example, the module 80 is constructed of plastic and includes a base 82. Bases 82 of the modules form the inner periphery 18B of the filter frame 18. Note that the bases 82 are interconnected in back-to-back relationship and secured around and to the drum 40. Each base 82 includes openings on opposite sides. These openings form openings 18D in the inner periphery 18B of the filter frame. Extending upwardly from the bases 82 are the support arms 18A that has been discussed above. As seen in Figure 1, outer covers 86 are interconnected between adjacent modules 80. Thus, the modules 80, along with the outer covers 86, form the filter frame 18 shown in Figure 1.

[0022] Formed on opposite sides of each module 80 is a pair of filter grooves. These filter grooves receive the surrounding frames of respective filter segments 20. A seal can be interposed between the filter segments 20 and the filter grooves.

[0023] Figure 3 depicts one way in which the backwash guides 12 can be incorporated into the modules 80. Note that a pair of backwash guides 12 extends along a leading side of the support arms 18A of the modules 80. In particular, each backwashing guide 12 is integrally formed with a portion of the support arms 18A and projects slightly inwardly therefrom in the manner illustrated in Figure 2. Therefore, on the leading side of each support arm 18A there is provided a pair of backwash guides 12 that extend over a substantial length of the support arms 18A. Note that these backwash guides 12, in conjunction with the modules 80 and the filter segments 20, also form a pair of backwash channels 22 on leading sides of the support arms. Backwash channels 22 include inner terminal ends that terminate adjacent the openings in the bases 82. Thus as described above, during a backwashing operation backwash channels 22 function to guide and direct a mixture of backwash and suspended solids to the openings formed in the bases 82 of the modules 80. And like discussed above, the openings in the bases 82 are aligned with openings 40A of the drum 40 and hence the backwash and suspended solids mixture passing from the openings in the bases 82 flows through the openings 40A into the underlying solids trough 14.

[0024] The volume and dimensions of the backwash channels 22 can vary. This is especially the case because the width of the filter disc 16 varies from one disc filter to another. Figure 1B uses L, H and ϕ to denote dimensions and an angle relative to the backwash guides 12. Again, the length of L and H, as well as the angle ϕ, will vary. However, in exemplary embodiments, L would typically be 5-85 mm, H 3-40 mm, and ϕ 2°-83°.

[0025] Figure 6 illustrates how the backwash guides 12 and the backwash channels 22 facilitate the recovery of the backwash and suspended solids mixture and how they guide and direct the mixture into the solids trough 14. The flow of the backwash and suspended solids mixture is shown by heavy dotted lines and arrows in Figure 6. Figure 6 does not show the backwash channels 22. The dotted lines and arrows are meant to simply represent the flow of

the backwash and suspended solids mixture through the respective filter discs 16. Note also in Figure 6 where the flow of the mixture passes through openings 18D in the inner periphery of the filter frame and from there through the array of openings 40A formed in the drum and then into the underlying solids trough 14.

[0026] The filter discs 16, drum 40, along with the backwash guides 12 and the backwash channels 22 are incorporated into a disc filter 10. It may be beneficial to briefly review the basic design of an exemplary disc filter. The disc filter 10, shown in Figures 4 and 5, includes a housing. Some rotary disc filters (a second type) are not provided with a substantial housing structure. These disc filters are often referred to as frame-type disc filters as they are designed to be installed in a pre-formed concrete basin. There is yet a third type or version of a disc filter which includes a half tank or frame with a bottom and sides and which only reaches to about the center of the drum of the disc filter.

[0027] In any event, either type of disc filter is provided with a frame structure for supporting various components that make up the disc filter. In this regard, the drum 40 is rotatively mounted on the frame structure of the disc filter. Generally the drum 40 is closed except that it includes an inlet opening and the array of openings 40A discussed above. The filter discs 16 are secured to the drum 40 and rotatable therewith during a backwashing operation. During the filtering of water or liquid, influent water or liquid is directed into the inlet of the drum 40 and from the drum into the filter discs 16 secured on the drum. The number of filter discs 16 secured to the drum can vary. A water holding area is defined inside each filter discs 16 for receiving and holding water or liquid to be filtered by the disc filter 10. Head pressure associated with the influent liquid or water is effective to cause the water or liquid to flow outwardly from the filter discs 16 and through the filter segments 20. Water exiting the filter discs 16 is filtered water or filtrate. As discussed above, this results in suspended solids in the water or liquid being captured or retained on the inner surfaces of the filter segments 20.

[0028] Filtered water or liquid exiting the filter discs 16 is collected in a holding chamber that underlies the filter discs. This holding chamber or area includes an outlet that enables the filtered water or liquid to be discharged from the disc filter 10.

[0029] During the backwashing operation, it is necessary for the drum 40 and the filter discs 16 mounted thereon to rotate. Disc filter 10 is provided with a drive system for rotatively driving the drum 40 and the filter discs 16. In the case of the embodiment illustrated in Figures 4 and 5, mounted to a panel or wall structure about the back portion of the disc filter 10 is a drum motor 90 that is operative to drive a sprocket or sheave connected to a shaft on which the drum 40 is mounted. See Figure 5. Various means can be operatively interconnected between the drum motor 90 and the sprocket or sheave for rotating the drum 40. In one example, a chain drive is utilized to drive a sprocket secured to the shaft that rotates the drum 40. Various other types of drive systems can be utilized to rotate the drum and the filter discs 16. In some cases, for example, there may be a direct drive on the drum shaft from a gear motor.

[0030] Returning to the backwash system 30 discussed above, the system comprises a

backwash pump 33, a manifold 34 that extends along a side portion of the disc filter 10, and a series of feed tubes 35 connected to the manifold 34 and projecting inwardly therefrom. Feed tubes 35, sometimes referred to as inner pipes, project from the manifold 34 into areas between respective filter discs 16. Secured to the feed tubes 35 are a series of nozzle holders or nozzle bars 36. Nozzles 32 are mounted on the nozzle bars 38. In a preferred embodiment, the backwash pump 33 forms a part of the disc filter. In other embodiments, pressurized backwash can be provided from a source other than a backwash pump that forms a part of the disc filter 10.

[0031] Manifold 34 can be rigidly mounted or rotatively mounted along one side of the disc filter 10. In some cases, manifold 34 is operatively connected to a drive (not shown) that can be indirectly driven from the drum motor 90. In any event, the manifold 34, during a cleaning operation, can oscillate back and forth, which results in the nozzles 32 sweeping back and forth between the filter discs 16 so as to backwash particular areas of the filter segments 20 disposed on opposite sides of the filter discs 16. In other cases, the manifold 24 is rigidly mounted and does not oscillate back and forth during the backwashing operation.

[0032] There are many advantages to the backwash guides 12. They assure that a larger percentage of the backwash and suspended solids mixture end up in the solids trough 14. One measure of the effectiveness of the backwash guides 12 can be appreciated from examining what is referred to herein as "separation speed of suspended solids" (mg separated suspended solids/s). In order to determine the separation speed of suspended solids, the first step is to measure the flow of the backwash and suspended solids mixture being discharged by the disc filter 10. Secondly, a sample of the flow of the backwash and suspended solids mixture is taken and a total suspended solids (TSS) test is carried out which gives the concentration of suspended solids (mg/L) of the backwash and suspended solids mixture. The separation speed of the suspended solids is defined as the product of the flow and the suspended solids concentration. The employment of the backwash guides 12 will, in most cases, increase the separation speed of the suspended solids.

[0033] "Configured to" is used in this application. The term "configured to" means "designed to".

REFERENCES CITED IN THE DESCRIPTION

Cited references

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all

liability in this regard.

Patent documents cited in the description

- KR101039326 [0003]
- KR101339328 [0003]
- EP2514500A [0003]

Patentkrav

1. Drejeskivefilter (10) til filtrering af en væske, omfattende:
en drejetromle (40) til at modtage væsken, hvilken tromle har en flerhed af åbninger, der er udformet i en overflade deraf,
et faststofkar (14), der er anbragt i tromlen, og som er konfigureret til at modtage en blanding af returskylning og faste stoffer i suspension,
én eller flere filterskiver (16), der er fastgjort til tromlen, og som er konfigureret til at modtage væske fra tromlen og filtrere væsken, når væsken strømmer udad fra filterskiven gennem filtermedie, der udgør en del af filterskiven,
hvor filterskiven omfatter en filterramme (18), der bærer filtermediet på modsatte sider deraf,
idet filterskiven omfatter en flerhed af åbninger (18D), der er udformet i en indre periferi af filterskiven,
en drivmekanisme til at drive tromlen i rotation og få filterskiven til at rotere med tromlen,
et returskylningssystem til returskylning af filtermediet og omfattende en flerhed af dyser (32), der er anbragt uden for filterskiven, og som er konfigureret til at lede returskylningen gennem filtermediet og ind i filterskiven, hvor returskylningen fjerner faste stoffer i suspension fra filtermediet, og en blanding af returskylning og faste stoffer i suspension dannes,
en flerhed af returskylningsføringer (12), der er fastgjort til eller udformet i et stykke med filterrammen, og som rager indad fra filterrammen ind i filterskiven, idet returskylningsføringerne rager indad fra modsatte sider af filterskiven ind i det indre af filterskiven og omfattende aflange kanter, der er skråtstillet indad i forhold til filtermediet,
returskylningsføringerne og en del af filterskiven danner en række returskylningskanaler (22), der strækker sig gennem filterskiven,
hvor returskylningskanalerne strækker sig generelt mod åbningerne i den indre omkreds af filterskiven, og
hvor returskylningskanalerne i en returskylningsoperation er

konfigureret til at modtage mindst en del af blandingen af returskylning og faste stoffer i suspension og lede returskylningen og de faste stoffer i suspension til åbningerne i den indre omkreds af filterskiven, hvor returskylningen og de faste stoffer i suspension passerer gennem åbningerne i tromlen og ind i faststofkarret.

2. Drejeskivefilter ifølge krav 1, hvor de returskylningsføringer, der rager ud fra den ene side af filterskiven, er transversalt justeret med de returskylningsføringer, der rager ud fra den anden side af filterskiven.

3. Drejeskivefilter ifølge krav 2, hvor de transversalt justerede returskylningsføringer er adskilt, således at et åbent område afgrænses mellem de transversalt justerede returskylningsføringer.

4. Drejeskivefilter ifølge krav 1, hvor returskylningskanalerne strækker sig generelt mellem den ydre og den indre periferi (18B, 18C) af filterskiven, og hvor returskylningskanalerne omfatter indre endedele, og hvor returskylningskanalernes indre endedele ender tilstødende åbningerne i den indre periferi af filterskiven.

5. Drejeskivefilter ifølge krav 1, hvor returskylningskanalerne er anbragt parvis, idet parrene af returskylningskanaler er tansversalt justerede og i rundtgående afstand omkring filterskiven.

6. Drejeskivefilter ifølge krav 1, hvor filtermediet omfatter en række filtersegmenter (20), der bæres i filterrammen, og hvor filtersegmenterne og filterrammen danner en række rum omkring filterskiven, og hvor returskylningsføringerne og returskylningskanalerne er udformet på rummenes forkanter.

7. Fremgangsmåde til filtrering af en væske og til returskylning af et filtermedie i et drejeskivefilter, hvilken

fremgangsmåde omfatter:
at lede væsken ind i en drejetromle (40),
at lede væsken fra drejetromlen ind i én eller flere filterskiver (16), der er fastgjort til drejetromlen, og som har filtermedie anbragt på modsatte sider af filterskiven,
filtrering af væsken og fjernelse af faste stoffer i suspension fra væsken ved, at væsken føres fra filterskiven udad gennem filtermediet, hvilket medfører, at i det mindste nogle af de faste stoffer i suspension i væsken tilbageholdes på en indre overflade af filtermediet,
returskylning af filtermediet ved:
rotation af tromlen og filterskiven, således at dele af filtermediet roteres til en position, der kan returskylles af dyser (32), som er anbragt uden for filterskiven,
at lede en returskylning fra dyserne gennem filtermediet og ind i det indre af filterskiven og i processen, hvorved i det mindste nogle af de faste stoffer i suspension, der er blevet tilbageholdt på den indre overflade af filtermediet, løsnes, hvilket giver anledning til en blanding af returskylning og faste stoffer i suspension i filterskiven,
modtagelse af blandingen af returskylning og faste stoffer i suspension i en række returskylningskanaler (22), der er anbragt i filterskiven, og som udgøres af en flerhed af returskylningsføringer, der er fastgjort til eller udformet i et stykke med en filterramme, der udgør en del af filterskiven, og hvor returskylningsføringerne omfatter aflange kanter, der er skråtstillet indad i forhold til filtermediet, og som rager indad fra modsatte sider af filterskiven ind i det indre af filterskiven,
under rotationen af filterskiverne åbnes de forreste dele af returskylningskanalerne i bevægelsesretningen, og
at lede blandingen af returskylning og faste stoffer i suspensionen gennem returskylningskanalerne og fra returskylningskanalerne gennem åbninger i en indre periferi af filterskiven og gennem åbninger i tromlen og ind i et faststofkar, der er anbragt i tromlen.

8. Fremgangsmåde ifølge krav 7, der omfatter returskylning af

filtermediet, når tromlen, filterskiven og returskylningskanalerne roteres; og mens tromlen, filterskiven og returskylningskanalerne roteres, skylning af blandingen af returskylning og faste stoffer i suspension ind i returskylningskanalerne.

9. Drejeskivefilter ifølge krav 1, hvor filterrammen omfatter en flerhed af rundtgående adskilte støttearme (18A), idet støttearmene strækker sig mellem en indre periferi (18B) og en ydre periferi (18C) af filterrammen, og
hvor returskylningsføringerne rager ud fra den ene side af støttearmene i filterskivernes rotationsretning.

10. Drejeskivefilter ifølge krav 9, hvor:
støttearmene (18A) omfatter en indre del (18A1), og
hvor returskylningsføringerne rager ud fra en ende af de indre dele af støttearmene.

11. Drejeskivefilter ifølge krav 10, hvor returskylningskanalerne udgøres af returskylningsføringerne, støttearmene, tætningerne (54) og filtermediet.

12. Drejeskivefilter ifølge krav 1, hvor returskylningsføringerne er skråtstillet med en vinkel θ på 2°-83°.

13. Drejeskivefilter ifølge krav 1, hvor: filterrammen omfatter en flerhed af rundtgående adskilte støttearme 18A, idet hver støttearm omfatter en indre del 18A1, og
hvor returskylningsføringerne rager ud fra den ene ende af støttearmenes indre dele med en vinkel θ på 2°-83° i forhold til støttearmenes indre dele, og hvor returskylningsføringerne rager ud i filterskivens rotationsretning under returskylningen,
hvor returskylningskanalerne i en returskylningsoperation er konfigureret til at modtage mindst en del af en blanding af returskylning og faste stoffer i suspension og lede blandingen af returskylning og faste stoffer i suspension gennem åbningerne i en indre omkreds af filterskiven, hvor blandingen af

returskylning og faste stoffer i suspension passerer gennem åbninger i tromlen og ind i et faststofkar i tromlen, og hvor returskylningskanalerne strækker sig generelt mellem en ydre og en indre periferi af filterskiven, og hvor returskylningskanalerne omfatter indre endedele, der ender tilstødende åbningerne i den indre periferi af filterskiven.

14. Fremgangsmåde ifølge krav 7, hvorved returskylningskanalerne omfatter åbne sider, der vender i filterskivernes rotationsretning under returskylningen.

15. Fremgangsmåde ifølge krav 7, hvorved returskylningsføringernes aflange kanter er skråtstillet indad med en vinkel θ på 2°-83° i forhold til filtermediet.

DRAWINGS

Drawing

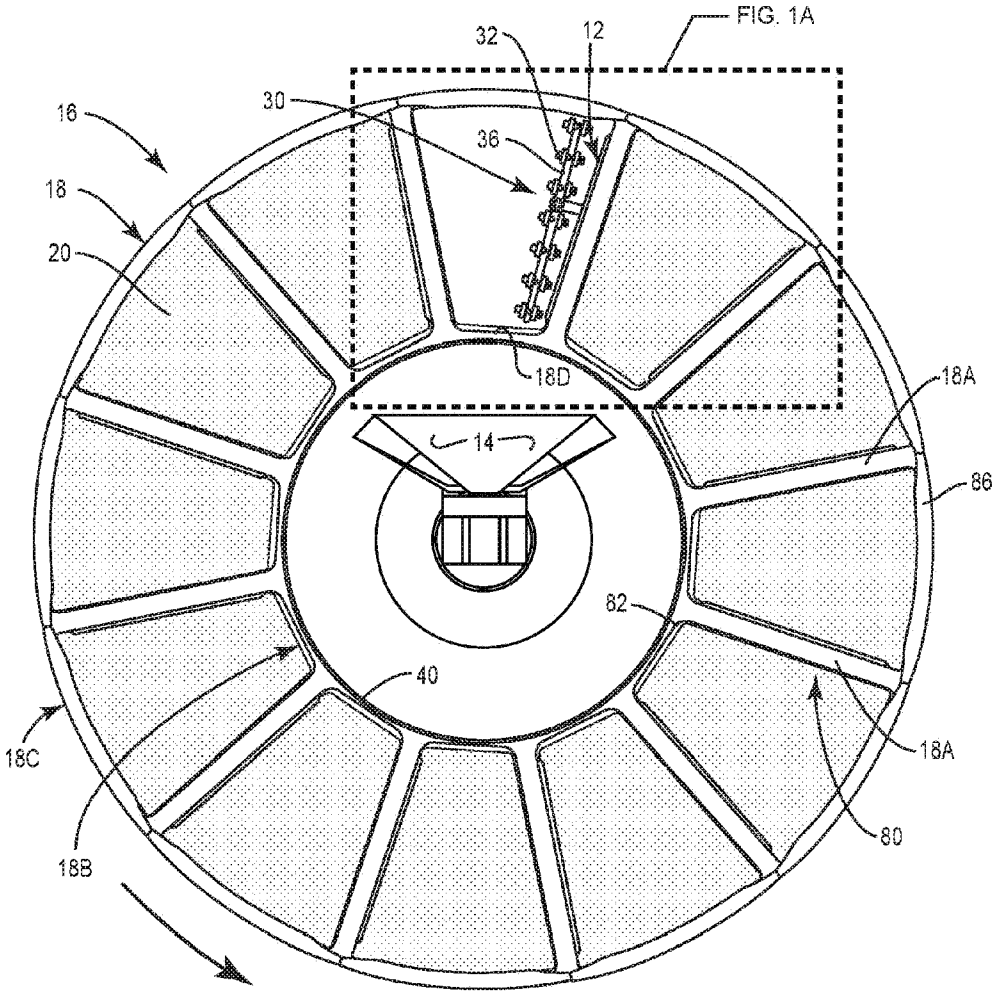

FIG. 1

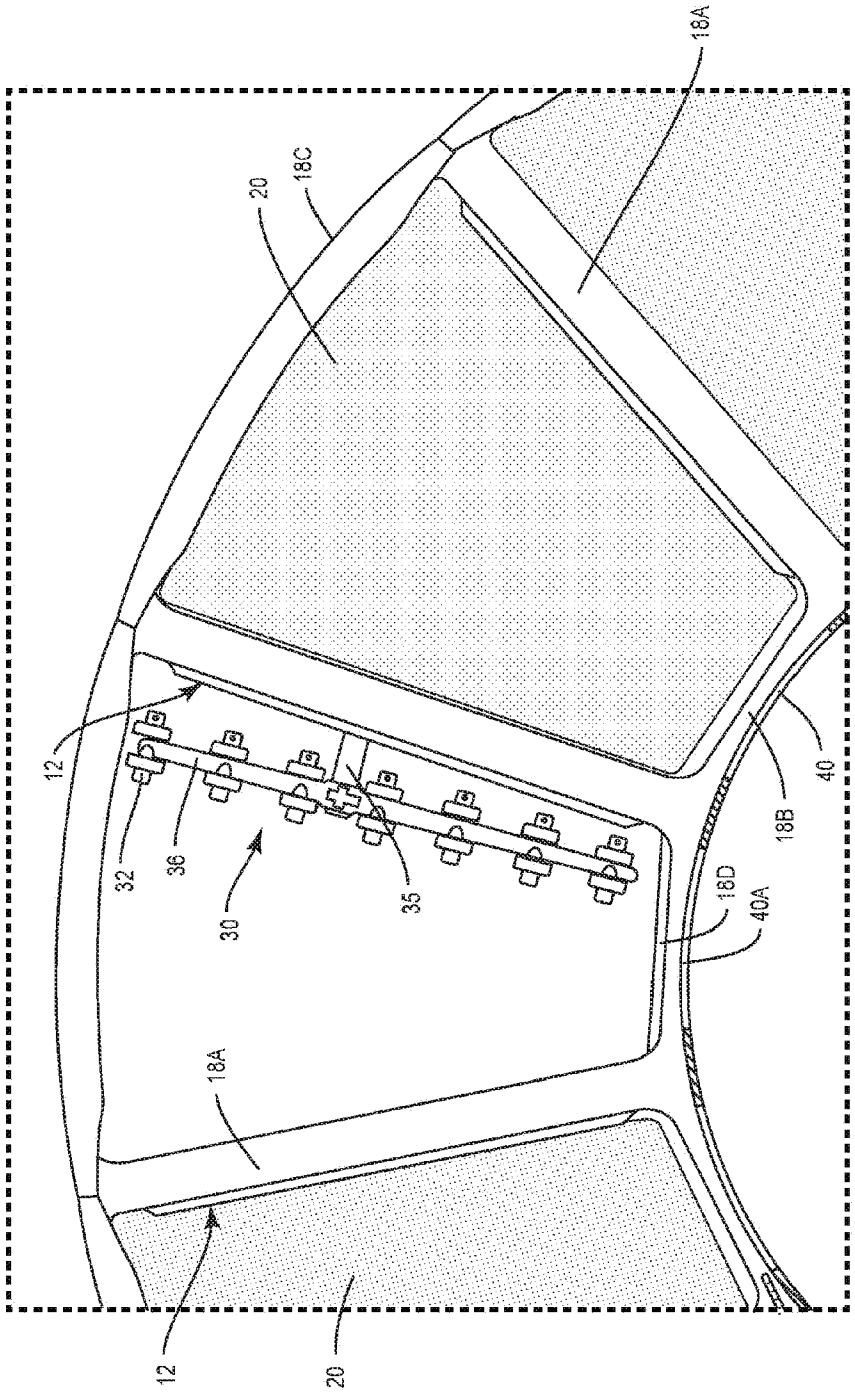

FIG. 1A

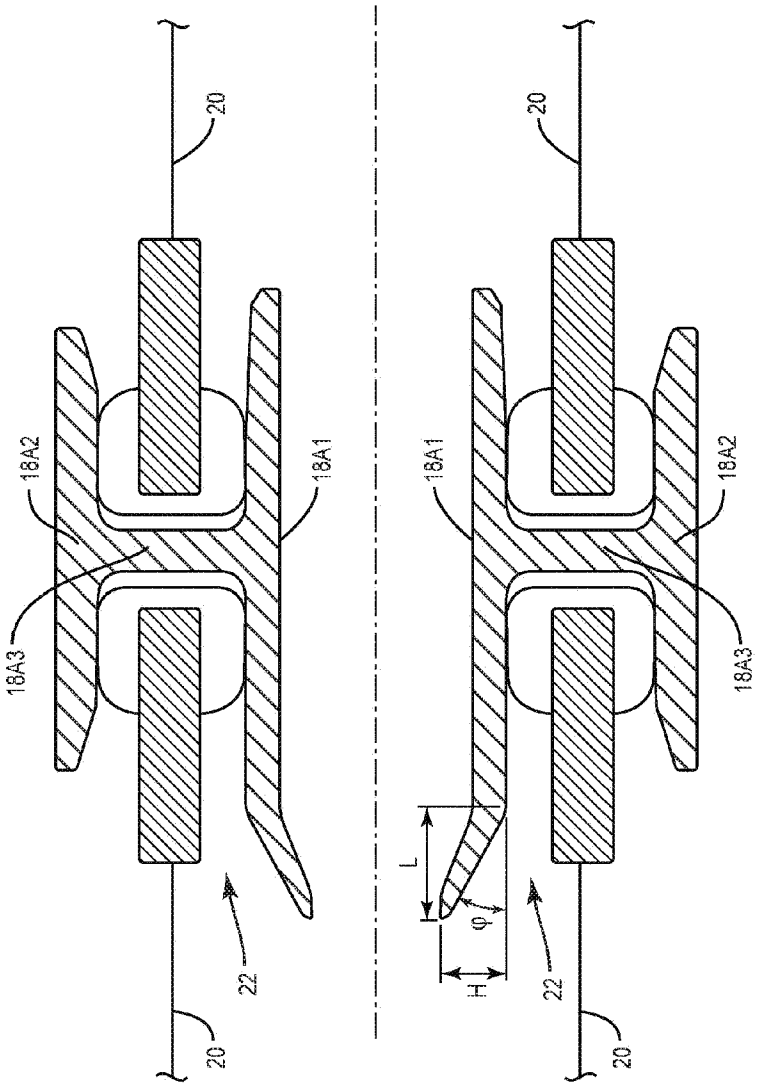

FIG. 1B

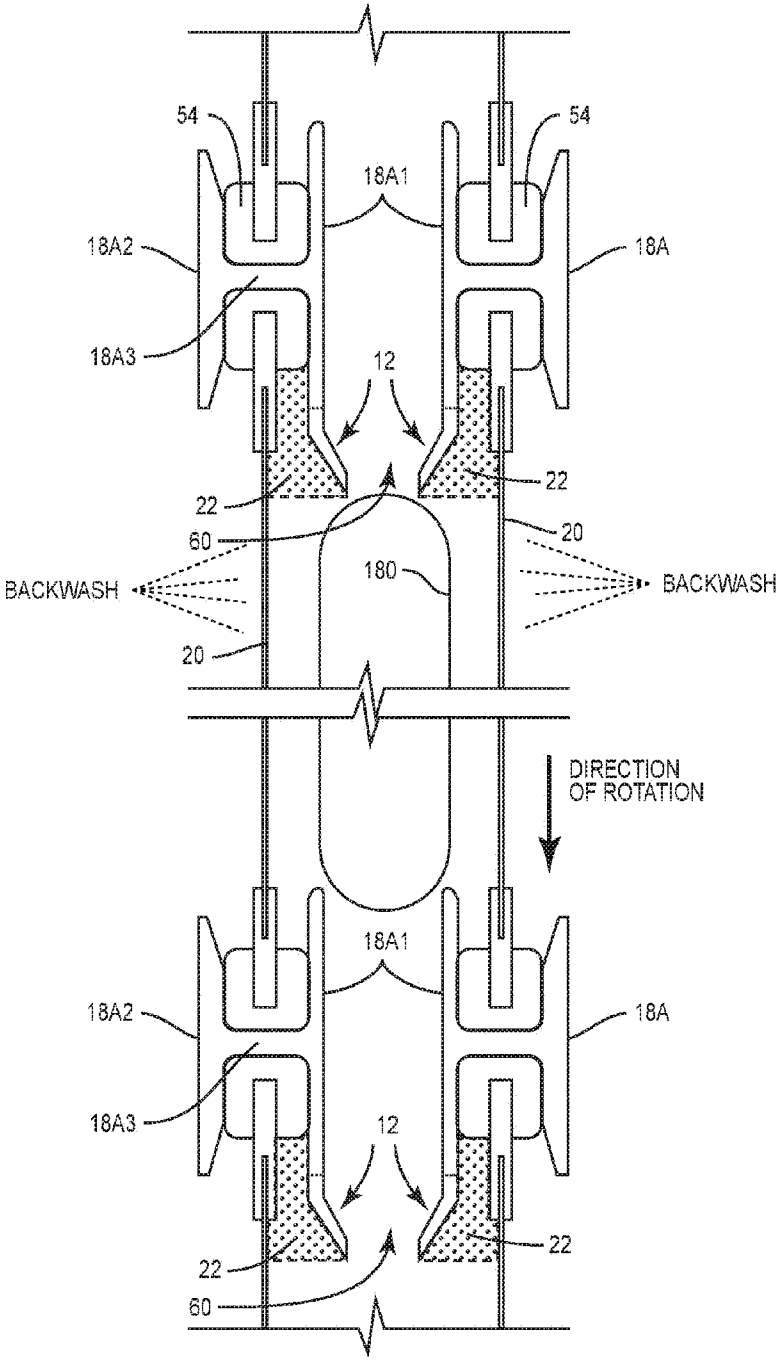
54
54
18A1
18A2
18A
18A3
12
22
22
60
20
BACKWASH
180
BACKWASH
20
DIRECTION
OF ROTATION
18A1
18A2
18A
18A3
12
22
22
60

FIG. 2

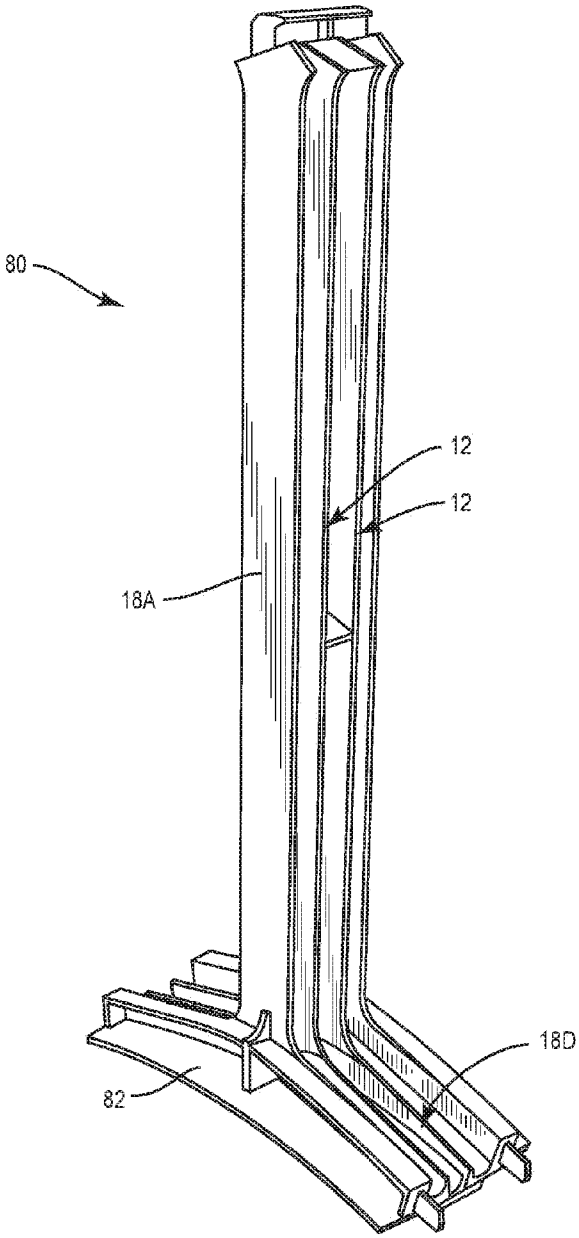

FIG. 3

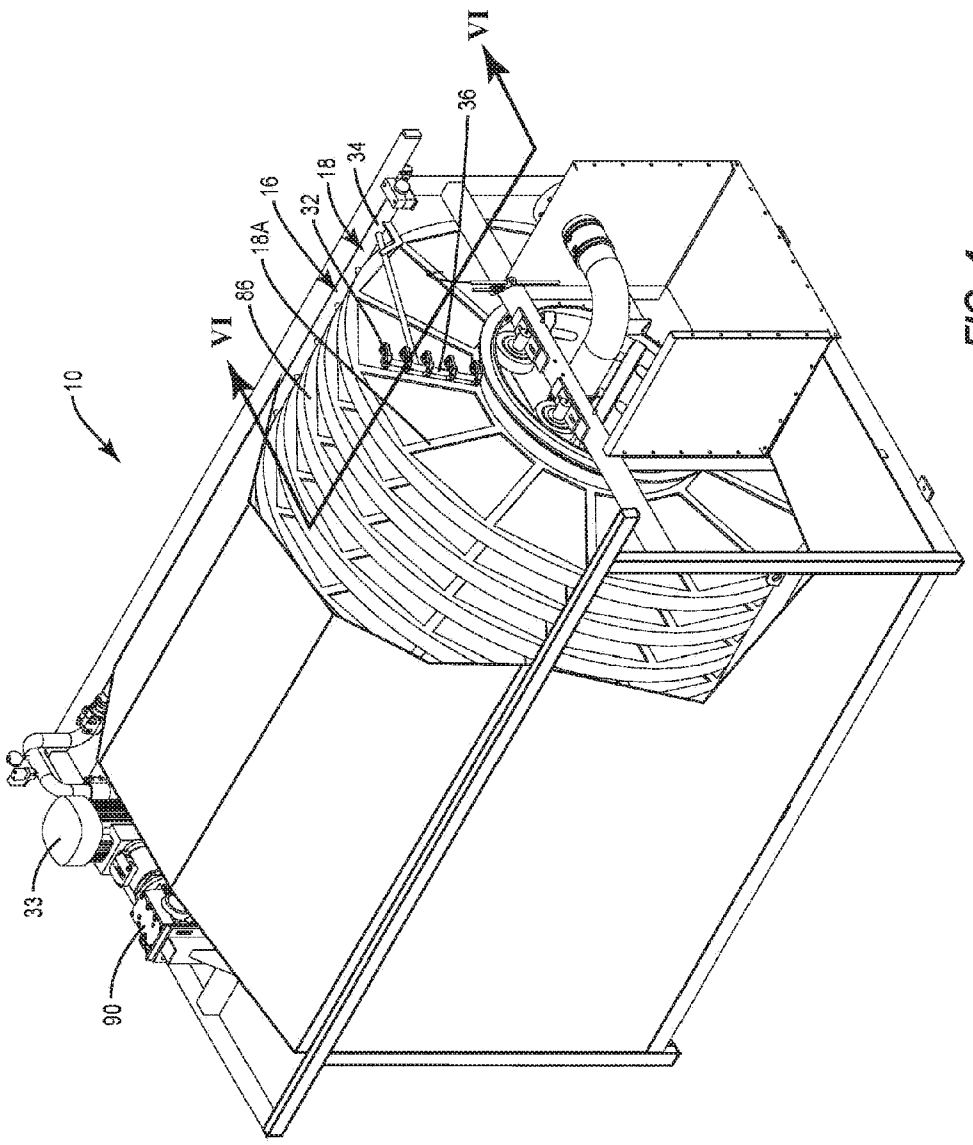

FIG. 4

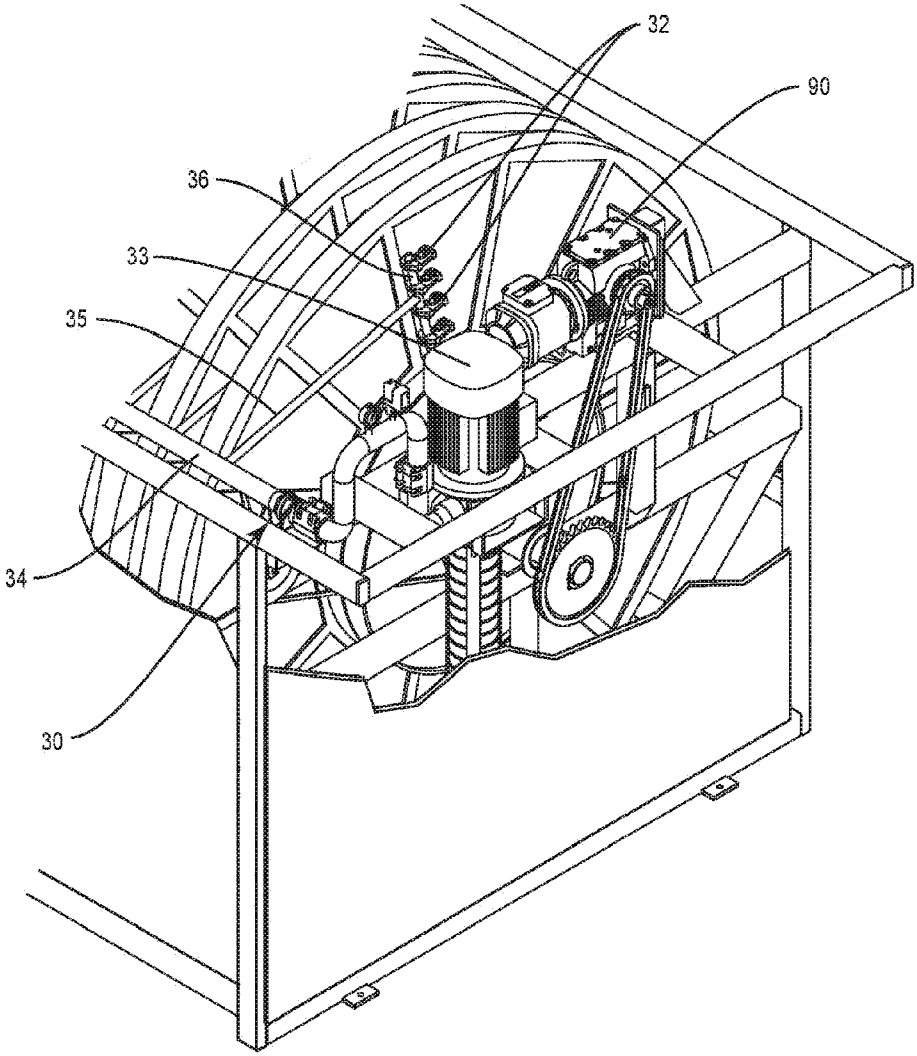

FIG. 5

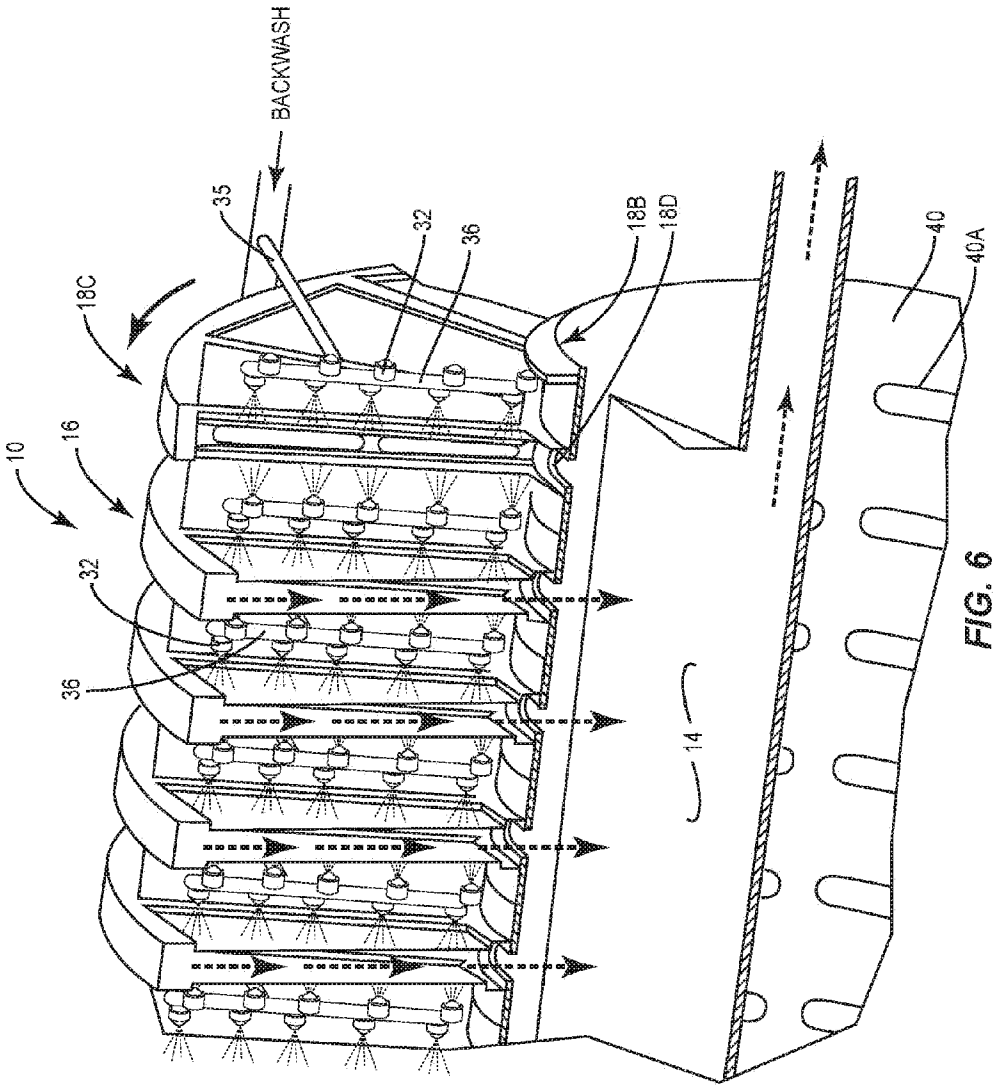

FIG. 6