

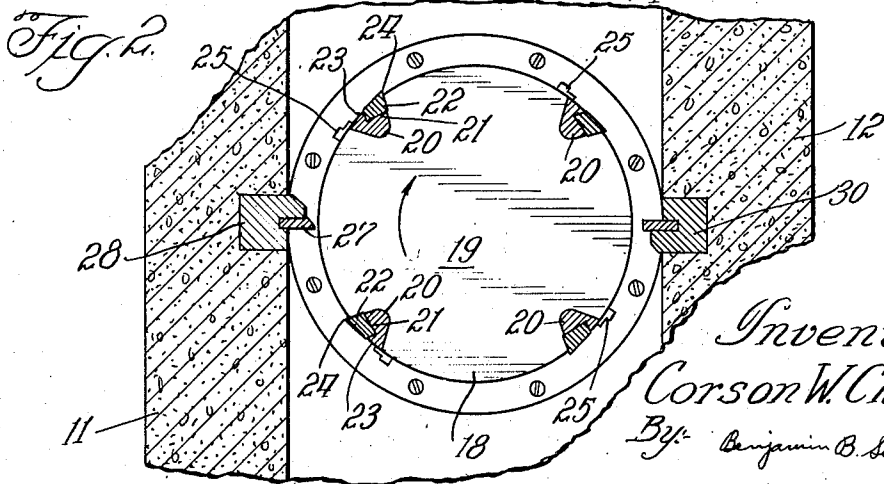
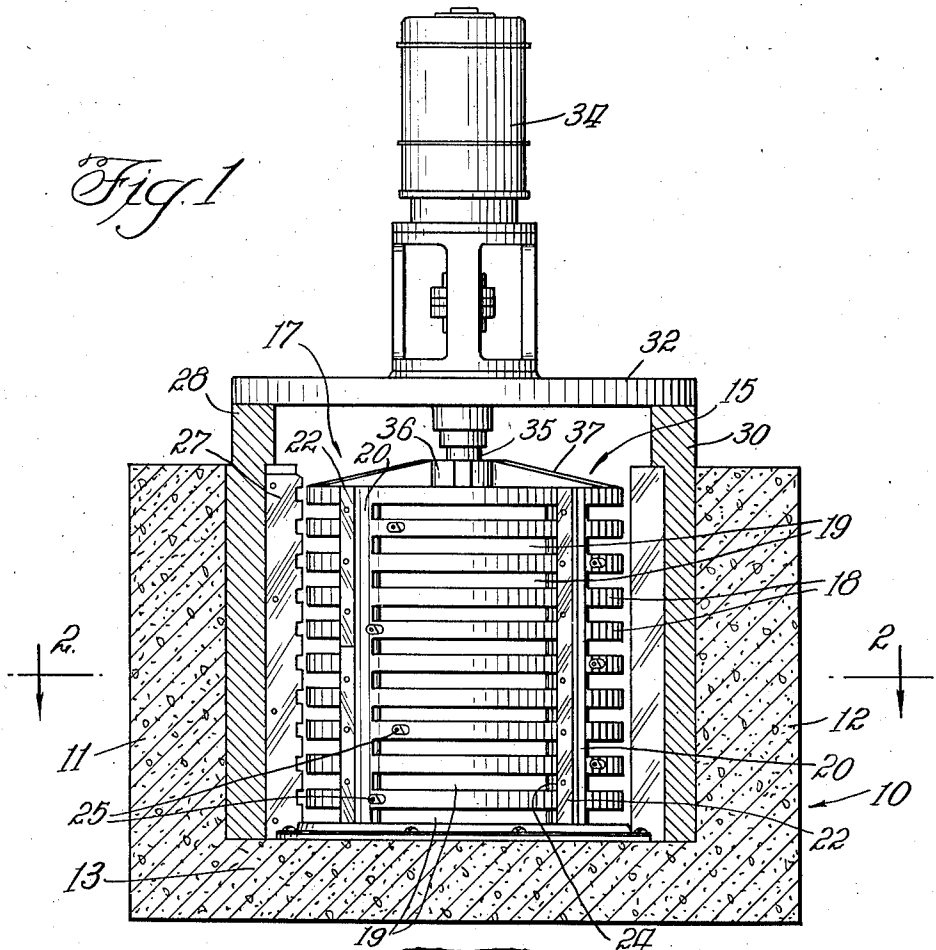
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THROUGH-FLOW COMMUNUTOR

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THROUGH-FLOW COMMINUTOR

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4 Claims. (Cl. 210—152)

This invention relates to comminutors of the through-flow type which are designed for use in the channel of a flowing stream containing solids or semi-solids, as, for example a sewage or waste liquor stream, to intercept large solids and comminute or reduce them into pieces small enough to flow with the sewage or waste liquor and smaller solids through the comminutor to the down-stream channel, from which they are lead to a place for further treatment as is well-understood in the art.

In general, the prior art through-flow comminutors comprise a plurality of rotatable, spaced, horizontally disposed screening plates or discs which serve as a screen to intercept large solids and to permit sewage or waste liquor and smaller solids to pass through the spaces or slots between the plates. The screening plates are mounted for rotation on a shaft which extends vertically through the plates. These plates carry cutting teeth on their peripheral edges which cooperate with a notched cutting bar to comminute the intercepted solids. In actual operation, the larger solids intercepted by the screening plates are held against the peripheral edges of the plates by the pressure of the flowing stream and are carried by the plates to the cutting bar so as to permit the cutting teeth to cut or shear off small pieces therefrom as the teeth pass through the notches of the cutting bar.

In the operation of these prior art through-flow comminutors, rags, paper and the like not infrequently pass through the slots without being comminuted and some of these rags, etc. as well as some of the comminuted rags, etc. and other fibrous material wrap themselves around the shaft or center hub and, in time, accumulate thereon to such an extent as to block the flow of the sewage through the comminutor. This results not only in a costly, time-consuming shaft or hub cleaning operation, but, and what is more important, in an interruption of the sewage flow.

I overcome these serious objections to the prior art through-flow comminutors by the comminutor of the present invention which, while generally similar to the prior art comminutors, is, nevertheless, radially different in that it has no central hub or shaft about which rags, etc. may wind themselves and accumulate to block the flow. The comminutor of the present invention has other advantages which will be made apparent from the following detailed description of a preferred embodiment which is shown in the drawing. It is to be understood that my invention is not to be construed as limited to the particular

embodiment shown in the drawing and described herein since many changes may be made therein without departing from the scope of the appended claims.

The present invention is clearly illustrated in the drawing accompanying this specification, in which:

Figure 1 is a front elevation of a comminutor in accordance with the present invention with the channel in which the comminutor is disposed shown in vertical transverse section; and

Fig. 2 is a horizontal section thereof taken substantially along the line 2—2 of Fig. 1.

In the drawing, the numeral 10 designates a sewage channel of U-shaped section, suitably formed of concrete, having side walls 11, 12 and a bottom 13. A comminutor 15 of the through-flow type is positioned in the channel across the normal path of sewage flow. The comminutor comprises a screen, designated generally by the numeral 17, which is formed by a plurality of horizontally disposed, spaced, rotating plates or discs 18 positioned one above the other. The spaces 19 between the discs are the slots or openings through which sewage liquor, small solids and comminuted solids pass from the upstream to the downstream side of the channel. These plates are securely ganged together in spaced relation by means of connecting members or posts 20 extending between adjacent discs. These posts are positioned at spaced intervals adjacent the peripheries of the discs and a sufficient number of such posts are provided between each adjacent pair of discs as to render the ganged discs rigid. In the drawing, four such posts are shown between each adjacent pair of discs and, as is evident, a greater or lesser number may be used.

The screen may be formed by casting the discs and posts into the integral structure shown. It may be otherwise formed, however, as by welding or otherwise securing the posts or other spacer elements between adjacent discs.

In casting the discs and posts integrally in accordance with the preferred form of my invention, the posts alone or the posts and discs are vertically slotted to provide recesses 21 for receiving shear bars 22 of hard wear resisting metal. In the embodiment of the invention shown in the drawing both the discs and posts are slotted. These shear bars extend lengthwise of the screen and are secured integrally thereto, as by welding, bolts or other suitable means which connect the shear bars to either the discs or to the posts. As is evident, these shear bars are, in effect, a part of the posts.

The outside surface 23 of each post is substantially flush with the peripheries of the discs. The outside surface of each shear bar is tangentially disposed with respect to the peripheries of the discs to provide a forward shearing edge 24 which extends slightly outwardly from the peripheries of the discs.

Cutting teeth 25 are provided on the peripheral edges of each disc and these teeth together with the shear bars cooperate with a stationary notched cutting bar 27 to comminute the sewage solids strained out of the sewage by the discs.

The cutting bar is bolted or otherwise secured to a pilaster 28 which is embedded in the concrete of wall 11 of the channel. The outer extremity of the cutting bar is so positioned as to have a scraping or wiping contact with the shearing edges 24 of the shear bars 22. The notches in cutting bar 27 are so located that cutting teeth 25 pass through them and shear or cut the solids carried to the cutting bar by the screen and reduce them to a size small enough to pass through slots 19.

Diametrically opposed to the cutting bar is a pilaster 30, embedded in the concrete of wall 12 of the channel, which serves to prevent solid matter from passing between the screen and wall 12 to the downstream side of the channel and thereby insures that all intercepted solids will be carried by the screen to the cutting bar for comminution.

A table 32 is mounted upon the pilasters and this table provides a support for a motor 34 which rotates the screen. The motor is provided with a short, outwardly extending, stub motor shaft 35 which is secured as by a drive fit to the hub portion 36 of cross bracket members 37 which are, in turn, welded or otherwise secured integrally to the top disc of the screen. Members 37 may, of course, be cast integrally with the top disc. It is evident from this construction that the screen is rotated by the turning force of the shaft on the cross members 37 at the top of the screen, thereby eliminating the centrally disposed shaft with its attendant disadvantages.

In the operation of the comminutor of the present invention sewage or waste liquor and small solids pass through slots 19 and the larger solids intercepted by the discs are carried thereby to the cutting bar and there comminuted to a size small enough to pass through the slots. Rags, etc. in the sewage stream may wrap themselves about the posts and shear bars, but since the forward edge of the shear bars is scraped by the forward edges of the cutting comb, these rags, etc. will be cut away from the posts and shear bars thereby preventing the blocking of the sewage flow. Since the posts and shear bars are positioned along the peripheral edges of the discs and rigidly support them along these edges, the spacial relationship between the discs is maintained substantially constant and the peripheries of the discs are prevented from warping or buckling to such an extent as to permit the cutting teeth on the peripheries of the discs to strike the notched cutting bar, thereby avoiding damage to either the cutting teeth or to the cutting bar. Due to the elimination of the

conventional vertically disposed shaft and of all other obstructions interiorly of the slots, the flow of sewage, including small solids and comminuted solids, through the slots is free and substantially unimpeded at all times.

I claim:

1. In a through-flow comminutor, rotatable spaced discs ganged together to form a rotatable screening element, the spaces between said discs forming the slots in said screening element, said slots being free from any axially disposed obstructions in the path of flow therethrough, said discs being joined one to the other to form the screening element by connecting means extending between adjacent discs substantially at the peripheries thereof, and means to rotate said screening element including a drive shaft connected to said screening element exteriorly thereof.

2. In a through-flow comminutor, rotatable discs joined together in spaced relationship by connecting means extending between adjacent discs substantially at the peripheries thereof to form a screening element, the spaces between said discs forming the slots of said screening element, said slots being free from all obstructions in the path of flow therethrough except at the outer extremities thereof, and means to rotate said screening element including a drive shaft connected to said screening element exteriorly thereof.

3. In a through-flow comminutor, rotatable discs joined together in spaced relationship by connecting means extending between adjacent discs substantially at the peripheries thereof to form a screening element, the spaces between said discs forming the slots of said screening element, said slots being free from all obstructions in the path of flow therethrough except at the outer extremities thereof, cutting teeth projecting from the edges of said discs, a stationary notched cutting bar cooperating with the cutting teeth to comminute solids caught between the cutting bar and cutting teeth, and means to rotate said screening element including a drive shaft connected to said screening element exteriorly thereof.

4. In a through-flow comminutor, rotatable discs joined together in spaced relationship by connecting means extending between adjacent discs substantially at the peripheries thereof to form a screening element, the spaces between said discs forming the slots of said screening element, said slots being free from all obstructions in the path of flow therethrough except at the outer extremities thereof, cutting teeth projecting from the edges of said discs, a stationary notched cutting bar cooperating with the cutting teeth to comminute solids caught between the cutting bar and cutting teeth, said cutting bar being so positioned with respect to the peripheries of the discs during rotation of the latter as to be in substantial wiping relation with respect thereto, whereby rags, etc. which may wrap around said peripheral connecting means will be cut therefrom, and means to rotate said screening element including a drive shaft connected to said screening element exteriorly thereof.

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