

Sept. 15, 1942.

C. W. CHASE

2,295,633

COMMUNICATING MEANS

Filed Sept. 9, 1939

Fig. 1.

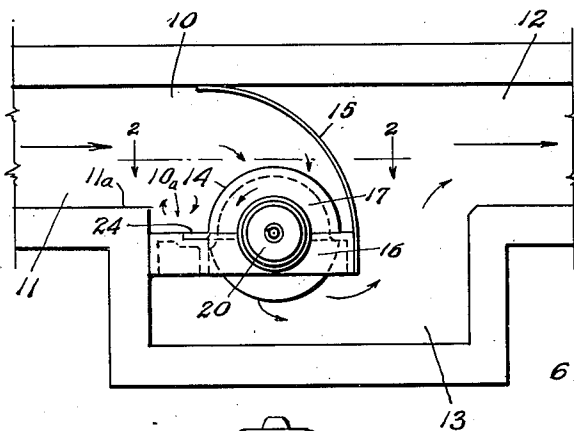


Fig. 2.

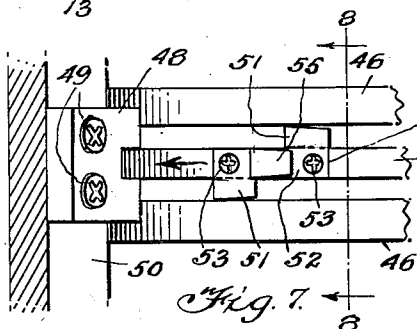
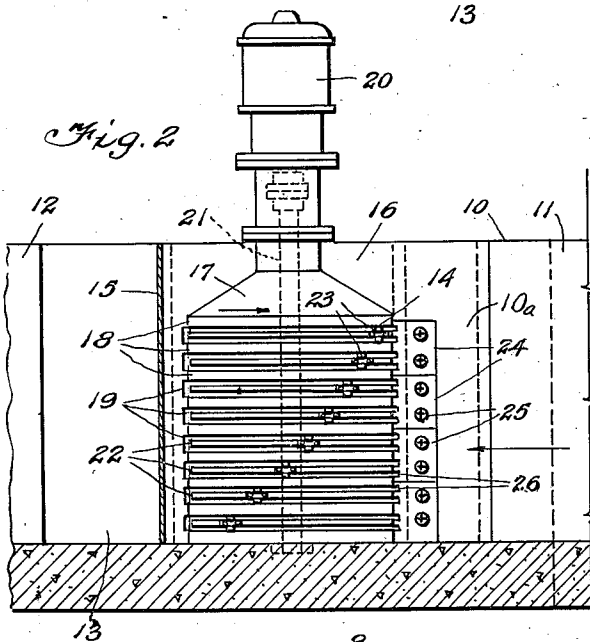


Fig. 7.

Fig. 6.

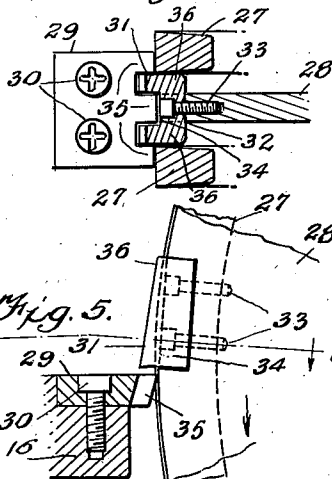


Fig. 5.

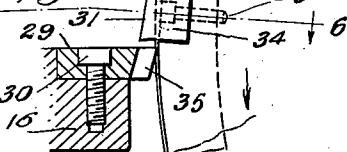


Fig. 4.

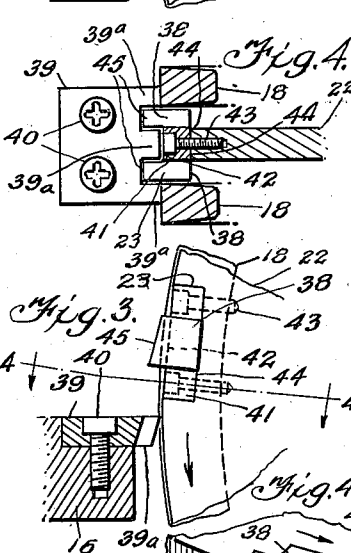


Fig. 3.

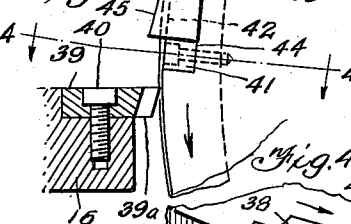
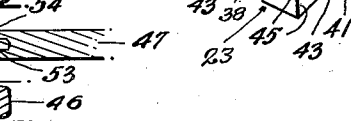


Fig. 4a.



Fig. 8.



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UNITED STATES PATENT OFFICE

2,295,633

COMMINUTING MEANS

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Application September 9, 1939, Serial No. 294,147

10 Claims. (Cl. 210-152)

This invention relates to comminuting means of which the comminutor is interposed in a flowing stream of liquids containing solids, and functions first, to detain solids that are too large to pass through slots of the comminutor along with the flow of liquids, and second, to reduce the solids to particles small enough to pass through the slots. The invention has reference more particularly to that type of comminutor through which the flow moves transversely through the comminutor, and is commonly called "through flow" comminutors.

In through flow comminutors considerable difficulty has been encountered by reason of solids accumulating on the upstream side of the comminutor and particularly at the stationary cutting element thereof, the result being that the cutting teeth of the comminutor merely cut grooves in the accumulated mass and run idly in the grooves. Furthermore the accumulated mass clogs the comminutor slots and blocks the flow of liquids therethrough, thereby requiring frequent attention by an attendant in clearing away the mass.

One object of the present invention is to provide an arrangement of parts whereby the flowing stream sets up eddy currents at the stationary cutting element of the comminutor, whereby the solids are agitated and are not permitted to accumulate in a mass but are kept in motion whereby different parts thereof are constantly being presented to the cutting elements.

Another object is to provide novel cutters on the rotating elements of the comminutor which function to rid the slots of solids and also serve to cut or comminute the solids. The cutters also function to prevent entanglement of fibrous solids with the cutters and co-acting stationary cutting element. This entanglement prevents the free motion of solids in the process of being cut up and results in the accumulation hereinbefore mentioned.

Other objects and advantages will appear in the course of this specification, and with all of said objects and advantages in view, this invention consists in the several novel features hereinafter fully set forth and claimed.

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

Fig. 1 is a plan view of a portion of a sewage channel and illustrating one embodiment of the comminuting means therein.

Fig. 2 is a vertical longitudinal section taken on the line 2-2 of Fig. 1.

Fig. 3 is a detail view of fragments of the cut-

ting elements shown in Fig. 2 partly in plan and partly in horizontal section.

Fig. 4 is a detail vertical section taken on the line 4-4 of Fig. 3.

Fig. 4a is a detail fragmental perspective view of the cutter carrier and the cutter shown in Figs. 3 and 4.

Fig. 5 is a detail view of fragments of another form of cutting elements, partly in plan and partly in horizontal section.

Fig. 6 is a detail vertical section taken on the line 6-6 of Fig. 3.

Fig. 7 is a detail fragmental side elevation of another modified form of cutting means.

Fig. 8 is a detail vertical section taken on the line 8-8 of Fig. 7.

Referring to said drawing and first to Figs. 1 and 2, the reference character 10 designates a channel, desirably formed of concrete, through which flows sewage or other liquids containing solids. The flow of the stream is in the general direction indicated by the arrows in Fig. 1.

The character 11 designates the upstream or inlet end, and 12 the downstream or outlet end, and 13 a pit or offset part of the channel. The comminutor 14 is located at the offset part of the channel, and a deflecting wall 15 extending from the straight wall of the channel to a wall 16 in the pit, serves to dam up the flow on the up stream side of the comminutor. The wall 16 may be composed of structural metal work and concrete and contains an opening in which the comminutor is located.

An offset or recess 10a is provided between the channel wall 11a and the comminutor 14, in which eddy currents are set up by the flowing stream at the place where the comminuting action of the comminutor takes place. The eddy currents serve to agitate solids that are likely to accumulate at the cutting place of the comminutor.

The comminutor comprises in general a series of spaced discs or other cutter carriers 22, mounted on a shaft 21, driven by an electric motor 20, supported on the wall 16. Located in the spaces between the discs, on the up stream side of the comminutor, are stationary spaced semi-circular screen bars 18, the ends of which are bolted or otherwise fastened to the wall 16 and the arcuate parts of which are disposed between the edge portions of the discs, but spaced from the discs to leave slots 19 for the passage of liquids and small solids through the comminutor from the upstream side to the downstream side thereof. The screen bars and discs detain or intercept the

solids which cannot pass through the slots, and the hereinafter cutting elements comminute the solids as will be presently described. Desirably a frusto conical hood 17 covers the uppermost disc of the comminutor, and sets in a correspondingly shaped opening in the wall 16.

Cutters 23 secured to the edge portions of the discs, cooperate with stationary notched cutting bars 24 to cut the solids into pieces small enough to pass through the slots in the comminutor. The cutting bars are usually made in sections bolted to the wall structure 16, which if desired may comprise structural metal frame work and concrete. The cutting bar is located in the offset or recessed part 10a of the channel, where the eddy currents are set up and stir or agitate any solids that accumulate at the cutting bar and thereby prevent them from lodging in a somewhat fixed position at the place where the comminuting action takes place. The wall 15 serves to direct the flow in the channel towards the wall 16 and the comminutor 14, in the arrangement of the parts as illustrated in Figs. 1 and 2.

The cutters employed on the discs may take various forms, and the one shown in Figs. 2, 3, 4, and 4a will now be described.

The cutter shown in these figures comprises a body 41 of the same thickness as the disc 22, and it is seated in a notch 44 formed in the edge portion of the disc. Projecting laterally from the body 41 are combined slotscrapers 36 and cutting teeth 45, of which the scrapers travel in the adjacent slots between the disc and screen bars 18 and serve to rid the slots of any material that may have lodged therein. The scrapers 36 may be in the form of lugs formed on the upper and lower sides of the body and they protrude exteriorly of the slots and are formed with the cutting teeth 45 on their protruding edges. The body is made longer than the lugs to provide tail pieces for receiving the bolts or screws 43 which fasten the cutter to the disc.

The cutting bar, one section of which is shown at 39, is fastened to the frame structure of the wall 16 as by bolts or screws 40, and is formed with cutting teeth 39a between which are notches through which the cutting teeth 45 of the cutters pass and cooperate with the notched cutting bar to cut away small pieces of solids that are caught between the cutting bar and cutting teeth. The front face of the cutter body may be made flat as at 42 if desired.

The walls 15 and 16 prevent liquids from passing from the upstream side of the comminutor to the downstream side thereof, except by flowing horizontally through the spaces between the cutter carrying discs from one side of the comminutor to the other. Comminutors of this type have been commonly designated as "through flow" comminutors.

In the form of cutter illustrated in Figs. 5 and 6 the combined slot scrapers 36 and cutting teeth 31 are of the same length as the body 34, which is seated in a notch in the disc 28 and fastened thereto by bolts or screws 33. The scraper parts of the cutters travel in the slots between the disc 28 and adjacent screen bars 27. The cutter bar sections 29 are fastened to the wall structure 16 by bolts or screws 30, and its teeth 35 leave notches therebetween for the passage of the cutting teeth 31 as in the form previously described.

In the form of cutter illustrated in Figs. 7 and 8 the body 52 of the cutter is seated in a notch 54 in the disc 47 and fastened thereto by bolts or

screws 53. Scraper lugs 51 project laterally from both sides of the body of the cutter, one from either end thereof and travel in the slots between the disc 47 and screen bars 46. A cutting tooth 55 projects outward from the body 52 and cooperates with the notched cutting bar section 48 to comminute solids. The cutting bar section is fastened to its support by bolts or screws 49.

In all of the forms of cutters shown, the laterally projecting lugs thereof serve as scrapers traveling in the slots 19 and freeing them from solids that may have become lodged therein, and the cutting teeth cooperate with the cutting bar to comminute solids. Any solids such as rags, paper string and so forth that lodge on the stationary screen bars or may enter the slots, are carried along the screen bars by the cutters to the stationary cutting bar where they are comminuted.

I claim as new and desire to secure by Letters Patent:

1. In comminuting means, a through flow comminutor having rotating spaced cutter carrying discs between which liquids flow from one side of the comminutor to the other side thereof, said discs being provided with cutting teeth on their edges, and a stationary notched cutting bar, cooperating therewith to comminute solids, in combination with walls providing a channel in which the comminutor is located and other wall means cooperating with said channel walls to provide a recessed space, which is laterally off-set with respect to one of the channel walls, the comminutor being disposed, in part, in said recessed space with its cutting bar located in said space, whereby eddy currents, formed in said space by a flowing stream, agitate solids that accumulate on the cutting bar in said space.

2. In comminuting means, a through flow comminutor, having stationary semi-circular screen bars and spaced rotatable cutter carrying discs with their edge portions traveling in the spaces between the screen bars and provided with teeth which project radially beyond the edges of the discs, the edge portions of the cutter carrying discs being spaced from the screen bars to provide slots between the cutter carrying discs and screen bars, through which liquid flows from one side of the comminutor to the other, and a stationary notched cutting bar co-operating with said cutting teeth to comminute solids, in combination with walls providing a channel in which the comminutor is interposed and other walls cooperating with the channel walls to provide a laterally recessed space, the comminutor being disposed, in part, in said space, with its cutting bar located in said space, whereby eddy currents formed in said space by a flowing stream, agitate solids that accumulate on the cutting bar in said space.

3. In comminuting means, a through flow comminutor, having stationary spaced semi-circular screen bars and spaced rotatable cutter carrying discs with their edge portions traveling in the spaces between the screen bars and provided with cutting teeth which project radially from the edges of the cutter carrying discs, the edge portions of the cutter carrying discs being spaced from the screen bars to provide slots between the cutter carrying discs and screen bars, through which liquid flows from one side of the comminutor to the other, and a stationary notched cutting bar co-operating with said cutting teeth to comminute solids, in combination with walls providing a channel, in which the comminutor is

interposed, a wall off-set laterally from one of the channel walls, having an opening therein to receive the cutter carrying discs of the comminutor, and other walls connecting the ends of said off-set wall with the two walls of the chan- 5
nel to provide a laterally off-set recess, the comminutor being disposed, in part, in said space with its cutting bar located in said space, whereby eddy currents formed in said space by a flowing stream, agitate solids that accumulate on the 10
cutting bar in said space.

4. A comminutor comprising spaced semi-circular screen bars, spaced cutter carrying discs with their peripheral edge portions disposed in the spaces between the screen bars, there being 15
slots between said screen bars and edge portions of the cutter carrying discs, cutters secured to the cutter carrying discs at the edges thereof and having lugs projecting laterally from the cutter carriers into the adjacent slots, said lugs 20
being provided with cutting teeth projecting beyond the external faces of the screen bars and cutter carriers, a stationary notched cutting bar cooperating with the cutting teeth of the cutters to comminute solids caught between the cutting 25
bar and cutting teeth, and means to produce relative rotation between the cutter carriers and cutting bars.

5. A comminutor comprising stationary spaced semi-circular screen bars, rotatable spaced discs 30
with their edge portions disposed in the spaces between the screen bars and discs, cutters secured to the discs at the edges thereof, said cutters having body portions seated in notches in the edges of said discs and lugs projecting laterally from the body portions into the adjacent slots, said 35
cutters having also cutting teeth projecting beyond the external faces of the screen bars and discs, and a stationary notched cutting bar cooperating with the cutting teeth of the cutters to comminute solids. 40

6. A comminutor comprising stationary spaced semi-circular screen bars, rotatable spaced discs 45
with their edge portions disposed in the spaces between the screen bars, there being slots between the screen bars and discs, cutters secured to the discs at the edges thereof, said cutters having body portions seated in notches in the edges of said discs and lugs projecting laterally from the 50

body portions into the adjacent slots, and the lugs being formed with cutting teeth projecting beyond the external faces of the screen bars and discs, and a stationary notched cutting bar cooperating with the cutting teeth of the cutters to comminute solids.

7. A comminutor comprising stationary spaced semi-circular screen bars, rotatable spaced discs with their edge portions disposed in the spaces between the screen bars and discs, cutters secured to the discs at the edges thereof, said cutters having body portions seated in notches in the edges of said discs and lugs projecting laterally from the body portions into the adjacent slots, the body portion of the cutters extending circumferentially beyond the ends of the lugs whereby to receive the means that secure the cutters to the discs, said cutters being also formed with cutting teeth projecting radially beyond the external faces of the screen bars and discs, and a stationary notched cutting bar cooperating with the cutting teeth to comminute solids.

8. A comminutor comprising stationary spaced semi-circular screen bars, rotatable spaced discs with their edge portions disposed in the spaces between the screen bars and discs, cutters secured to the discs at the edges thereof, said cutters having body portions seated in notches in the edges of said discs and lugs projecting laterally from the body portions into the adjacent slots, said lugs being located at the ends of the body portion, and the cutters being formed with cutting teeth aligned with the discs, and a stationary notched cutting bar cooperating with said cutting teeth to comminute solids.

9. In a comminutor, a cutter carrying disc, and a cutter comprising a body portion secured in the edge portion of the disc and having scraper lugs projecting radially from both sides of the disc, and a tooth projecting radially from the body portion.

10. In a comminutor, a cutter carrying disc, and a cutter comprising a body portion secured in the edge portion of the disc and having scraper lugs projecting laterally from both sides of the disc, said lugs having cutting teeth on the front edges thereof.

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