



T.C.
TÜRK PATENT VE MARKA KURUMU
Patent Dairesi Başkanlığı

Sayı : E-39616753-110-220271984
Konu : Patent – Araştırma Raporu

07.04.2022

BAHİR BALLI (SADE DAN. PATENT ARGE HİZM. TİC. LTD. ŞTİ.)

İlgi : 11/07/2021 tarihli, 2021/011306 numaralı başvurunuz.

İlgide kayıtlı başvurunuzla ilgili olarak Kurumumuz tarafından düzenlenen tekniğin bilinen durumu konusundaki Araştırma Raporu ve Ekleri ilişikte gönderilmektedir.

6769 sayılı Sınai Mülkiyet Kanununun 98 inci maddesinin birinci fıkrası ve anılan Kanunun Uygulanmasına Dair Yönetmeliğin 102 nci maddesinin birinci fıkrası hükümleri uyarınca bildirim tarihinden itibaren üç ay içinde ücretinin de ödenerek inceleme talebinde bulunulması gerekmektedir. Aksi takdirde başvurunuz geri çekilmiş sayılacaktır.

İşbu yazıya konu talebi, Kurumumuzun Elektronik Başvuru Sistemi (epats.turkpatent.gov.tr) üzerinden, Benim Sayfam panelinde Başvuru Sonrası İşlemler menüsü altında yer alan "İnceleme Talebi" işlemi seçerek gerçekleştirebilirsiniz.

Öte yandan başvurunuzun korunması için gerekli olan yıllık ücretler üçüncü yıldan başlamak üzere her yıl vadesinde ödenir. Vade tarihi, başvuru tarihine tekabül eden ay ve gündür. Yıllık ücretler, vadesinde ödenmediği takdirde ek ücretle birlikte vadeyi takip eden altı ay içinde de ödenebilir. Yıllık ücretlerin bu süre içinde de ödenmemesi halinde başvuru geçersiz sayılır.

Başvuru tarihi veya varsa rüçhan tarihinden itibaren on sekiz aylık sürenin dolması veya bu süre dolmadan erken yayın talebiniz üzerine başvurunuz Bültende yayımlanır.

Saygılarımla.

Sevda ARSLAN
Kurum Başkanı a.
Sınai Mülkiyet Uzman Yardımcısı

EK :
1- Ek Listesi (1 Sayfa)

Bu belge, güvenli elektronik imza ile imzalanmıştır.

Belge Doğrulama Adresi : <https://belgedogrulama.turkpatent.gov.tr/bg.aspx?Id=5586E130-41FA-4343-A768-397A275C7450>

Gazi Mahallesi Hipodrom Caddesi No:13 (06560)

Yenimahalle / ANKARA

Telefon No: (0312) 303 1 303 Faks No : (0312) 303 11 73

İnternet Adresi www.turkpatent.gov.tr

Keş Adresi : tpe@hs01.kep.tr

Bilgi İçin: Ali EMİROSMANOĞLU

Unvan:

Telefon No:

Eposta: ali.emirosmanoglu@turkpatent.gov.tr





T.C.
TÜRK PATENT VE MARKA KURUMU
Patent Dairesi Başkanlığı

Bu belge, güvenli elektronik imza ile imzalanmıştır.

Belge Doğrulama Adresi : <https://belgedogrulama.turkpatent.gov.tr/bg.aspx?Id=5586E130-41FA-4343-A768-397A275C7450>

Gazi Mahallesi Hipodrom Caddesi No:13 (06560)

Yenimahalle / ANKARA

Telefon No: (0312) 303 1 303 Faks No : (0312) 303 11 73

İnternet Adresi www.turkpatent.gov.tr

Kep Adresi : tpe@hs01.kep.tr

Bilgi İçin: Ali EMİROSMANOĞLU

Unvan:

Telefon No:

Eposta: ali.emirosmanoglu@turkpatent.gov.tr





T.C.
TÜRK PATENT VE MARKA KURUMU
Patent Dairesi Başkanlığı

Ek-1

EK LİSTESİ

- 1- Araştırma Raporu
- 2- D1-JP2014214468A
- 3- D2-US2014299528A1
- 4- D3-US5422000A

Bu belge, güvenli elektronik imza ile imzalanmıştır.

Belge Doğrulama Adresi : <https://belgedogrulama.turkpatent.gov.tr/bg.aspx?Id=5586E130-41FA-4343-A768-397A275C7450>

Gazi Mahallesi Hipodrom Caddesi No:13 (06560)

Yenimahalle / ANKARA

Telefon No: (0312) 303 1 303 Faks No : (0312) 303 11 73

İnternet Adresi www.turkpatent.gov.tr

Kep Adresi : tpe@hs01.kep.tr

Bilgi İçin: Ali EMİROSMANOĞLU

Unvan:

Telefon No:

Eposta: ali.emirosmanoglu@turkpatent.gov.tr



Başvuru Sahibi:

İZMİR YÜKSEK TEKNOLOJİ ENSTİTÜSÜ REKTÖRLÜĞÜ

Başvuru No:

2021/011306

Başvuru Tarihi:

11/07/2021

(İlk) Rüçhan Tarihi

-

Patent Sınıfı (IPC):

E02B 15/04,E02B 1/00 (2022.01)

GENEL GÖZLEMLER

Buluş Bütünlüğü

Var (başvuru sadece bir buluş konusunu içermektedir)

... (başvuru birden çok buluş konusunu içermektedir) (Bakınız: Bölüm III)

Tarifname Takımı

Rapor aşağıda belirtilen tarifname takımı esas alınarak düzenlenmiştir.

Tarifname 8 sayfa (Orijinal)

İstem 9 adet (Orijinal)

Resim 3 sayfa (Orijinal)

Açıklık

Tüm istemler araştırılabilir niteliktedir.

... nolu istemler araştırılabilir nitelikte değildir. (Bakınız: Bölüm IV)

... Başvuruyla ilgili diğer görüşler (Bakınız: Bölüm II)

Raporun Tamamlandığı Tarih: **07/04/2022**

Türk Patent ve Marka Kurumu - Patent Dairesi
Başkanlığı
Hipodrom Cad. No:13 06330 Yenimahalle/ANKARA
Tel: (312) 303 1000
Faks: (312) 303 1220

Araştırmayı Yapan Uzman:

Ali EMİROSMANOĞLU

Başvuru Numarası:
2021/011306**A. BULUŞUN PATENT SINIFI (IPC)**
E02B 15/04,E02B 1/00 (2022.01)**B. ARAŞTIRILAN ALANLAR**
E02B**Araştırma esnasında kullanılan elektronik veritabanları ve -uygun olduğu durumlarda- kullanılan bazı anahtar kelimeler**

EPODOC, WPI, EPOQUE İngilizce ve Almanca Tüm-metin Veritabanları (TXTE, TXTDE), Türk Patent Veritabanı, Espacenet

"coanda mesh, motor, turbidity sensor, coanda ızgara, motor, bulanıklık sensörü" ve bunların uygun kombinasyonları

C. İLGİLİ DOKÜMANLAR

Kategori	Dokümanlar	İlgili Olduğu İstem
A	JP2014214468A (MAEDA SETSUBI KOGYO KK) 17 Kasım 2014 (17.11.2014) Tüm Doküman ----- -/--	1-9
A	US2014299528A1 (LAITRAM LLC [US]) 9 Ekim 2014 (09.10.2014) Tüm Doküman ----- -/--	1-9
A	US5422000A (HUBER; HANS G.) 6 Haziran 1995 (06.06.1995) Tüm Doküman ----- -/--	1-9

 İlgili Dokümanlar sonraki sayfadan devam etmektedir. Patent Ailesi Üyeleri ekine bakınız.**Kategorilerin Açıklaması:**

"X"	Buluşun yeni olmadığını veya buluş basamağı içermediğini tek başına gösteren doküman	"E" Başvuru tarihinde veya başvuru tarihinden sonra yayımlanan doküman
"Y"	Buluşun buluş basamağı içermediğini başka bir dokümanla bir araya getirildiğinde gösteren doküman	"T" Buluşun altında yatan ilke veya teoriyi anlamak için belirtilen doküman
"A"	Tekniğin bilinen durumunu belirten ama buluşla tam olarak ilgili olmayan doküman	"L" Başka nedenlerle belirtilen doküman
"O"	Yazılı olmayan açıklama	"D" Başvuruda belirtilen doküman
"P"	Başvuru tarihi ile rüçhan tarihi arasında yayımlanan doküman	"&" Aynı patent ailesinin dokümanı

Türk Patent ve Marka Kurumu - Patent Dairesi Başkanlığı
Hipodrom Cad. No:13 06330 Yenimahalle/ANKARA
Tel: (312) 303 1000
Faks: (312) 303 1220

Araştırmayı Yapan Uzman:

Ali EMİROSMANOĞLU

(19) 日本国特許庁(JP)

(12) 公開特許公報(A)

(11) 特許出願公開番号

特開2014-214468

(P2014-214468A)

(43) 公開日 平成26年11月17日(2014.11.17)

(51) Int. Cl.

E02B 5/08 (2006.01)

F1

E02B 5/08 I01

テーマコード (参考)

審査請求 未請求 請求項の数 3 O L (全 12 頁)

(21) 出願番号 特願2013-91615 (P2013-91615)
 (22) 出願日 平成25年4月24日 (2013.4.24)

(71) 出願人 500118780
 前田設備工業株式会社
 福井県敦賀市昭和町1丁目7番27号
 (74) 代理人 100080621
 弁理士 矢野 寿一郎
 (72) 発明者 前田 政義
 敦賀市昭和町1丁目7番27号 前田設備
 工業株式会社内

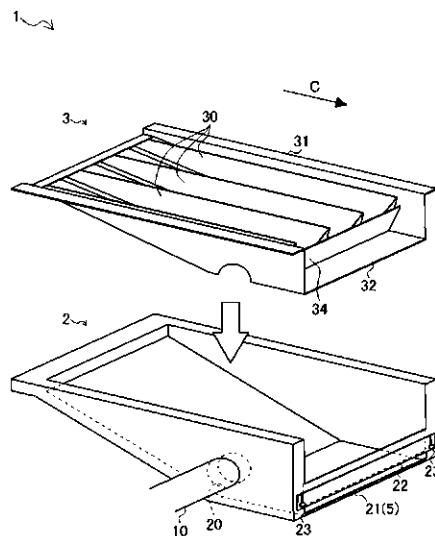
(54) 【発明の名称】 取水装置

(57) 【要約】

【課題】 取水槽内における取水口よりも下流側の部分に塵芥が溜まることを防止して、当該塵芥によって取水口が目詰まりを起こすことを防止することができる技術を提供することを課題とする。

【解決手段】 河川の川床Gに設置され、除塵部3によって塵芥が除去されて取水槽4内に流入した河川の水を取水口から流出させて取水するように構成される、取水装置1であって、取水口よりも下流側に配置され、取水槽4内の水とともに取水槽4内の塵芥を排出するように構成される、排塵口部5を具備する。

【選択図】 図1



【特許請求の範囲】**【請求項 1】**

河川の川床に設置され、除塵部によって塵芥が除去されて取水槽内に流入した前記河川の水を取水口から流出させて取水するように構成される、取水装置であって、

前記取水口よりも下流側に配置され、前記取水槽内の水とともに前記取水槽内の塵芥を排出するように構成される、排塵口部を具備する、

取水装置。

【請求項 2】

前記排塵口部は、上方に開口するように構成される、

請求項 1 に記載の取水装置。

10

【請求項 3】

前記取水槽内において前記取水口の上流側から下流側に流れてくる河川の水を前記取水口側に取込むように構成される取込部を具備する、

請求項 1 または請求項 2 に記載の取水装置。

【発明の詳細な説明】**【技術分野】****【0001】**

本発明は、取水装置の技術に関する。

【背景技術】**【0002】**

従来、河川の水を、融雪水、農業用水、工業用水、生活用水等として利用することが行われている。

このように、河川の水を用水として利用するためには、河川の水に含まれる塵芥を除去する必要があるため、例えば、複数の貯水槽と汲み上げポンプとからなる浄水施設の構成により河川の水の中の塵芥を除去している。

20

【0003】

また、河川の水に含まれる塵芥を除去する技術として、河川の川床に設置されて河川の水をろ過して取水する取水装置の技術は公知となっている（特許文献 1 参照）。

このような取水装置は、除塵部と、取水槽と、を具備し、除塵部によって塵芥が除去されて取水槽内に流入した河川の水を取水するように構成される。

30

取水装置は、除塵部によって塵芥が除去された（除塵部のスクリーン板の除塵孔を通過した）河川の水が取水槽内に流入し、当該取水槽内に流入した河川の水が取水口から流出するように構成される。

そして、取水装置は、前記取水槽内に流入した河川の水が取水口から流出して取水口に接続される取水管を介して貯水槽に流入するように構成される。

【先行技術文献】**【特許文献】****【0004】**

【特許文献 1】特開 2004-183292 号公報

【発明の概要】

40

【発明が解決しようとする課題】**【0005】**

しかしながら、前記取水装置では、除塵部で取除かれなかった塵芥が、取水槽内の水とともに取水口から流出せずに、取水槽内に滞留する場合がある。

そして、前記取水装置では、取水槽内で滞留した塵芥が、取水口よりも下流側に流れていき、取水槽内における取水口よりも下流側の部分において次第に溜まっていく場合がある。

このように、前記取水装置では、取水槽内に溜まる塵芥の量が増えていくと、当該塵芥によって取水口が目詰まりを起こす場合がある。

【0006】

50

本発明は以上の如き状況に鑑みてなされたものであり、取水槽内における取水口よりも下流側の部分に塵芥が溜まることを防止して、当該塵芥によって取水口が目詰まりを起こすことを防止することができる技術を提供することを課題とする。

【課題を解決するための手段】

【0007】

本発明の解決しようとする課題は以上の如くであり、次にこの課題を解決するための手段を説明する。

【0008】

即ち、請求項1においては、河川の川床に設置され、除塵部によって塵芥が除去されて取水槽内に流入した前記河川の水を取水口から流出させて取水するように構成される、取水装置であって、前記取水口よりも下流側に配置され、前記取水槽内の水とともに前記取水槽内の塵芥を排出するように構成される、排塵口部を具備するものである。

10

【0009】

請求項2においては、前記排塵口部は、上方に開口するように構成されるものである。

【0010】

請求項3においては、前記取水槽内において前記取水口の上流側から下流側に流れてくる河川の水を前記取水口側に取込むように構成される取込部を具備するものである。

【発明の効果】

【0011】

本発明の効果として、以下に示すような効果を奏する。

20

【0012】

即ち、本発明によれば、取水槽内における取水口よりも下流側の部分に塵芥が溜まることを防止して、当該塵芥によって取水口が目詰まりを起こすことを防止することができる。

【図面の簡単な説明】

【0013】

【図1】本発明の第一実施形態に係る取水装置の台部と除塵部とを分離した状態を示した斜視図。

【図2】同じく取水装置の全体的な構成を示した平面図。

【図3】同じく取水装置の全体的な構成を示した側面図。

30

【図4】同じく取水装置の河川に設置される状態を示した模式図。

【図5】同じく取水装置の河川に設置される状態を示した拡大模式図。

【図6】同じく取水装置の排塵口部が閉じられた状態を示した側面図。

【図7】本発明の第二実施形態に係る取水装置の台部と除塵部とを分離した状態を示した斜視図。

【図8】同じく取水装置の全体的な構成を示した側面図。

【図9】同じく取水装置の河川に設置される状態を示した模式図。

【図10】同じく取水装置の河川に設置される状態を示した模式図。

【図11】同じく取水装置の河川に設置される状態を示した拡大模式図。

【図12】同じく取水装置の排塵口部が閉じられた状態を示した側面図。

40

【図13】本発明の第三実施形態に係る取水装置の台部と除塵部とを分離した状態を示した斜視図。

【図14】同じく取水装置の全体的な構成を示した側面図。

【図15】同じく取水装置の全体的な構成を示した側面図。

【図16】同じく取水装置の河川に設置される状態を示した模式図。

【図17】同じく取水装置の排塵口部が閉じられた状態を示した側面図。

【発明を実施するための形態】

【0014】

次に、本発明の第一実施形態に係る取水装置1について、図1から図7を用いて説明する。なお以下において、図中における矢印Cは河川の水が流れる方向を示すものとして説

50

明する。

【0015】

取水装置1は、河川の川床Gに設置されて、河川の水をろ過して取水するものである。

取水装置1は、図1乃至図6に示すように、台部2と、除塵部3と、取水槽4と、排塵口部5と、を具備する。

【0016】

取水装置1の台部2は、取水装置1を設置しやすいように改良された河川の川床Gに固定して設置される(図4または図5参照)。取水装置1の台部2は、除塵部3が取付けられるものである。

取水装置1の台部2は、両側面と、底面と、を有する略箱状の部材である。取水装置1の台部2は、その上部と下流側上部とがそれぞれ開口するように形成される。

取水装置1の台部2は、取水口20を備える。

取水装置1の台部2の取水口20は、台部2の一方の側面に開口するように形成される。

取水装置1の台部2の取水口20は、一端の開口が貯留槽に接続される取水管10の他端の開口が接続されて構成される。

【0017】

取水装置1の除塵部3は、台部2に取り付け可能に構成される。取水装置1の除塵部3は、複数のスクリーン板30と、枠体31と、堰体34と、を備える。

【0018】

取水装置1における除塵部3のスクリーン板30は、河川の水の中の塵芥を除去可能な複数個の筋状の除塵孔を有して構成される板状の部材である。

取水装置1における除塵部3の複数のスクリーン板30は、河川の水が流れる方向の下流側(以下、「下流側」と言う)からみて、略鋸刃状または略波形状になるように接続される。取水装置1における除塵部3の複数のスクリーン板30は、略鋸刃状または略波形状の谷の部分が上流側から下流側に行くにしたがって深くなるように構成される。

【0019】

取水装置1における除塵部3の枠体31は、複数のスクリーン板30の四方(下流側、河川の水が流れる方向の上流側(以下、「上流側」と言う)上流側、および、両側)を囲むように構成される。取水装置1における除塵部3の枠体31は、スクリーン板30の下流側に配置されて、堰体34を支持する支持板32を有して構成される。

【0020】

取水装置1における除塵部3の堰体34は、スクリーン板30の下流側の略鋸刃状または略波形状の開口を閉じるようにして配置されて河川の水の流れを妨げて、河川の水を取水装置1内に形成される取水槽4へ導くものである。

取水装置1における除塵部3の堰体34は、その下部を回動支点として回動可能に枠体31の支持板32に支持されて、スクリーン板30の下流側に配置される。

取水装置1における除塵部3の堰体34は、不図示のウエイトが設けられて、河川の水の水勢によってその回動角度が変化するように構成される。

【0021】

取水装置1は、台部2の上部の開口から台部2内に除塵部3が嵌め込まれるようにして配置されて、除塵部3が台部2に取り付けられて構成される。取水装置1は、不図示のピンやネジ等によって除塵部3が台部2に固定されて構成される。

取水装置1は、台部2の両側面、台部2の底面、除塵部3の両側面(枠体31の両側面)、および、除塵部3の底面(スクリーン板30の底面、および、支持板32の底面)によって、取水装置1内に所定の空間が形成されるように構成される。前記取水装置1内の所定の空間は、取水装置1の取水槽4として構成される。

【0022】

取水装置1は、除塵部3によって塵芥が除去された(除塵部3のスクリーン板30の除塵孔を通過した)河川の水が、取水槽4内に流入するように構成される。

10

20

30

40

50

取水装置 1 は、前記取水槽 4 内に流入した河川の水が、台部 2 の取水口 2 0 から流出するように構成される。

取水装置 1 は、前記取水槽 4 内に流入した河川の水が、台部 2 の取水口 2 0 から流出して台部 2 の取水口 2 0 に接続される取水管 1 0 を介して貯水槽に流入するように構成される。

【0023】

取水装置 1 の排塵口部 5 は、台部 2 の取水口 2 0 よりも下流側に配置される。

取水装置 1 の排塵口部 5 は、台部 2 の下流側下部の面に開口するように形成される台部開口 2 1 によって構成される。取水装置 1 は、排塵口部 5 (台部開口 2 1) を介して、取水槽 4 内と取水槽 4 外とが連通するように構成される。

取水装置 1 の排塵口部 5 (台部開口 2 1) は、台部 2 の取水口 2 0 から流出せずに取水槽 4 内において取水口 2 0 よりも下流側の部分に至った(流れた)水が流出するように構成される。

また、取水装置 1 の排塵口部 5 (台部開口 2 1) は、台部 2 の取水口 2 0 から流出せずに取水槽 4 内において取水口 2 0 よりも下流側の部分に至った塵芥が流出するように構成される。

このようにして、取水装置 1 の排塵口部 5 (台部開口 2 1) は、取水槽 4 内の水とともに取水槽 4 内の塵芥を排出するように構成される。

【0024】

以上のように、取水装置 1 は、除塵部 3 によって塵芥が除去されて取水槽 4 に流入した河川の水を取水口 2 0 から流出させて取水するように構成される。

また、取水装置 1 は、取水口 2 0 よりも下流側に配置され、取水槽 4 内の水とともに取水槽 4 内の塵芥を排塵口部 5 から排出するように構成される、排塵口部 5 を具備する。

このため、取水装置 1 では、取水口 2 0 から流出せずに取水槽 4 内において取水口 2 0 よりも下流側の部分に至った塵芥は、取水槽 4 内の水とともに排塵口部 5 から排出されることとなる。

したがって、取水装置 1 によれば、取水槽 4 内における取水口 2 0 よりも下流側の部分に塵芥が溜まることを防止して、当該塵芥によって取水口 2 0 が目詰まりを起こすことを防止することができる。

【0025】

取水装置 1 は、図 1 乃至図 3、または、図 6 に示すように、蓋部 2 2 を具備する。

取水装置 1 における蓋部 2 2 は、板状の部材であり、排塵口部 5 (台部開口 2 1) を開閉可能に構成されるとともに、排塵口部 5 (台部開口 2 1) の開口の大きさを可変可能に構成される。

取水装置 1 における蓋部 2 2 は、ピンやネジ等からなる固定部材 2 3 によってその位置が固定可能に構成される。

取水装置 1 は、このように蓋部 2 2 の位置を固定することによって、排塵口部 5 (台部開口 2 1) の開口の大きさを一定の大きさに保持するように構成される。

【0026】

取水装置 1 は、除塵部 3 が台部 2 に固定するピンやネジ等を外すことによって、台部 2 から除塵部 3 を取外し可能に構成される。

このため、取水装置 1 によれば、取水装置 1 のメンテナンス作業、または、取水装置 1 (取水槽 4 内) の清掃作業、を容易に行うことができる。

【0027】

なお、本実施形態の取水装置 1 の台部 2 は、台部開口 2 1 が形成されない構成とされる。

【0028】

次に、本発明の第二実施形態に係る取水装置 1 について、図 7 から図 1 2 を用いて説明する。

なお、第二実施形態に係る取水装置 1 の説明は、第一実施形態に係る取水装置 1 と同様

10

20

30

40

50

の構成の部分については適宜省略し、第一実施形態に係る取水装置 1 の構成と異なる部分を中心に説明する。

【0029】

取水装置 1 の排塵口部 5 は、図 7 乃至図 11 に示すように、上方に開口するように構成される。

取水装置 1 の排塵口部 5 は、除塵部 3 における枠体 31 の支持板 32 の下流側端（枠体 31 の支持板 32 における台部 2 の上部と下流側上部との境界部分側端）が切り欠かれて形成される支持板開口 33 によって構成される。取水装置 1 は、排塵口部 5（支持板開口 33）を介して、取水槽 4 内と取水槽 4 外とが連通するように構成される。

取水装置 1 の排塵口部 5 は、除塵部 3 の堰体 34 の下流側に配置される。

10

【0030】

以上のように、取水装置 1 の排塵口部 5 は、上方に開口するように構成される。

このため、取水装置 1 では、取水口 20 から流出せずに取水槽 4 内において取水口 20 よりも下流側の部分に至った塵芥は、取水槽 4 内の水とともに上方に開口する排塵口部 5 から排出されることとなる。

したがって、取水装置 1 によれば、取水装置 1 を設置したときに取水装置 1 の下流側下部が（台部 2 の下流側面）河川の川床 G に接触するような場合（例えば、河川の川床 G に段差が無いような場合、または、河川の川床 G の勾配が緩やかな場合）であっても（図 10 または図 11 参照）、取水装置 1 が設置される部分よりも下流側の河川の川床 G を更に改良することを要さずに、取水槽 4 内の水とともに取水槽 4 内の塵芥を排出できる構成とすることができる。

20

【0031】

取水装置 1 は、案内部 6 を具備する。

取水装置 1 の案内部 6 は、排塵口部 5（支持板開口 33）に案内するものである。

取水装置 1 の案内部 6 は、台部 2 の下流側下部の角に塵芥が溜まること防止して、台部 2 の取水口 20 から流出せずに取水槽 4 内において取水口 20 よりも下流側の部分に至った塵芥を排塵口部 5（支持板開口 33）に案内するように構成される。

【0032】

取水装置 1 の案内部 6 は、台部 2 の底面の一部で構成される。

取水装置 1 の台部 2 の底面は、底面の下流側端が排塵口部 5 に至るように構成される。取水装置 1 の台部 2 の底面は、底面の下流側端が台部 2 の上部と下流側上部との境界部分に至るように構成される。

30

取水装置 1 の台部 2 の底面は、底面の取水口 20 よりも下流側の部分が、下流側に行くに従って次第に高くなるように傾斜して構成される。取水装置 1 の台部 2 の底面は、底面の取水口 20 よりも下流側の部分が下流側に行くに従って次第に上方に反り上がるように構成される。

取水装置 1 の台部 2 の底面は、台部 2 の下流側下部の角に角部を有さないように構成される。

取水装置 1 の案内部 6 は、前記台部 2 における底面の下流側に行くに従って次第に高くなるように傾斜する部分で構成される。

40

【0033】

以上のように、取水装置 1 は、取水槽 4 内の塵芥を排塵口部 5 に案内する案内部 6 を具備する。

取水装置 1 の案内部 6 は、台部 2 の下流側下部の角に塵芥が溜まること防止して、台部 2 の取水口 20 から流出せずに取水槽 4 内において取水口 20 よりも下流側の部分に至った塵芥を排塵口部 5（支持板開口 33）に案内するように構成される。

このため、取水装置 1 では、取水口 20 から流出せずに取水槽 4 内において取水口 20 よりも下流側の部分に至った塵芥は、台部 2 の下流側下部の角に塵芥が溜まらずに、取水槽 4 内の水とともに排塵口部 5 から排出されることとなる。

したがって、取水装置 1 によれば、底面から取水槽 4 内における取水口 20 よりも下流

50

側の部分に塵芥が溜まることを防止して、当該塵芥によって取水口 20 が目詰まりを起こすことを防止することができる。

【0034】

取水装置 1 は、図 7 乃至図 9、または、図 12 に示すように、蓋部 35 を具備する。

取水装置 1 における蓋部 35 は、板状の部材であり、排塵口部 5（支持板開口 33）を開閉可能に構成されるとともに、排塵口部 5（支持板開口 33）の開口の大きさを可変可能に構成される。

取水装置 1 における蓋部 35 は、ピンやネジ等からなる固定部材 36 によってその位置が固定可能に構成される。

取水装置 1 は、このように蓋部 35 の位置を固定することによって、排塵口部 5（支持板開口 33）の開口の大きさを一定の大きさに保持するように構成される。

10

【0035】

次に、本発明の第三実施形態に係る取水装置 1 について、図 13 から図 17 を用いて説明する。

なお、第三実施形態に係る取水装置 1 の説明は、第一実施形態または第二実施形態に係る取水装置 1 と同様の構成の部分については適宜省略し、第一実施形態または第二実施形態に係る取水装置 1 の構成と異なる部分を中心に説明する。

【0036】

取水装置 1 は、図 13 乃至図 17 に示すように、取水槽 4 内に取込部 7 を具備する。

取水装置 1 の取込部 7 は、取水槽 4 内において、取水口 20 の上流側から下流側に流れてくる河川の水を、取水口 20 側に取込むように構成される。

20

【0037】

取水装置 1 の取込部 7 は、管状の部材をその軸心に沿って二つに分割したような形状に形成される。

取水装置 1 の取込部 7 は、流入口 70 を有して構成される。取水装置 1 における取込部 7 の流入口 70 は、前記管状の部材の分割面側の開口で構成される。

取水装置 1 の取込部 7 は、取水槽 4 内に配置される。

取水装置 1 の取込部 7 は、台部 2 の両側面に亘って配置される。取水装置 1 の取込部 7 は、台部 2 の取水口 20 から、取水口 20 が形成されない側の側面に亘って配置される。

取水装置 1 の取込部 7 は、台部 2 の取水口 20 に接続するように構成される。

30

取水装置 1 の取込部 7 は、その流入口 70 が上流側を向くように配置される。

取水装置 1 の取込部 7 は、台部 2 の底面から所定の間隔を空けるように配置される。取水装置 1 の取込部 7 は、台部 2 の底面よりも上方に位置するように配置される。

【0038】

そして、取水装置 1 では、前記取水槽 4 内に流入して取水口 20 の上流側から下流側に流れる河川の水が、取込部 7 の流入口 70 から取込部 7 内に流入して台部 2 の取水口 20 に流出するように構成される。

このようにして、取水装置 1 では、取込部 7 によって水槽内において取水口 20 の上流側から下流側に流れてくる河川の水が取水口 20 側に取込まれる。

【0039】

以上のように、取水装置 1 は、取水槽 4 内において取水口 20 の上流側から下流側に流れてくる河川の水を取水口 20 側に取込むように構成される取込部 7 を取水槽 4 内に具備する。

40

このため、取水装置 1 では、取込部 7 を具備しないものに比べて、より確実に、取水槽 4 内の水を取水口 20 から流出させることができる。

【0040】

また、取水装置 1 の取込部 7 は、台部 2 の両側面に亘って配置される。台部 2 の底面よりも上方に位置するように配置される。

このように取込部 7 が配置される取水装置 1 では、台部 2 の底面と取込部 7 との間を流れる水の流速を早くすることができ、より確実に、台部 2 の底面の近傍の塵芥を排塵口部

50

5から排出することができる。

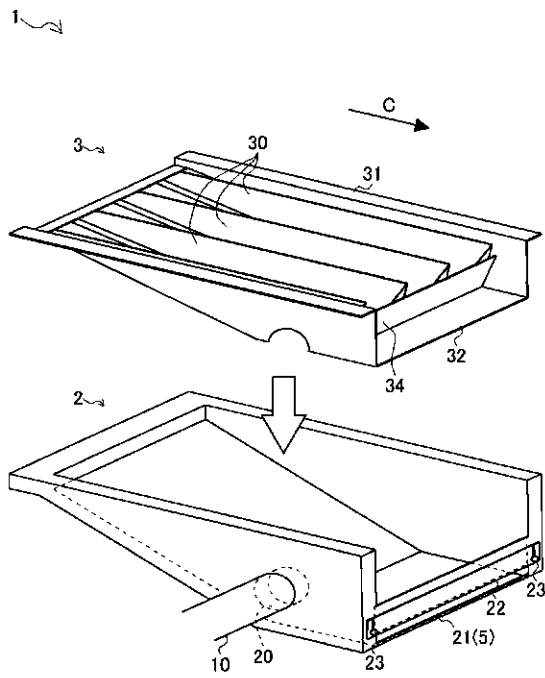
したがって、取水装置1によれば、台部2の底面の近傍に塵芥が溜まることをより確実に防止することができる。

【符号の説明】

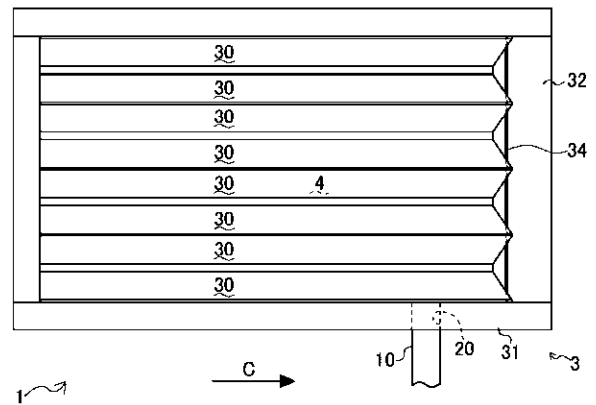
【0041】

- 1 取水装置
- 2 台部
- 3 除塵部
- 4 取水槽
- 5 排塵口部
- 20 取水口
- G 川床

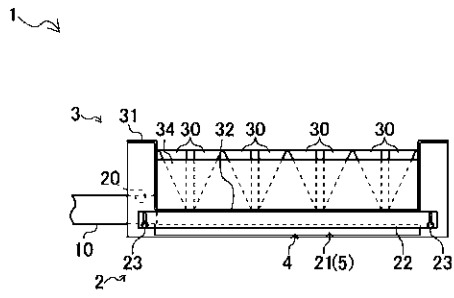
【図1】



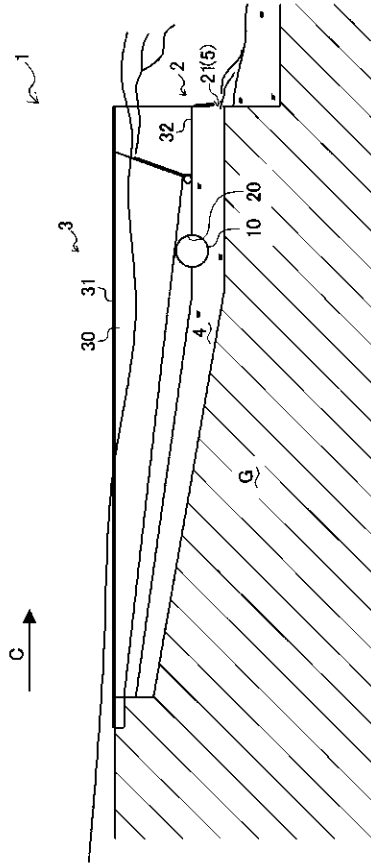
【図2】



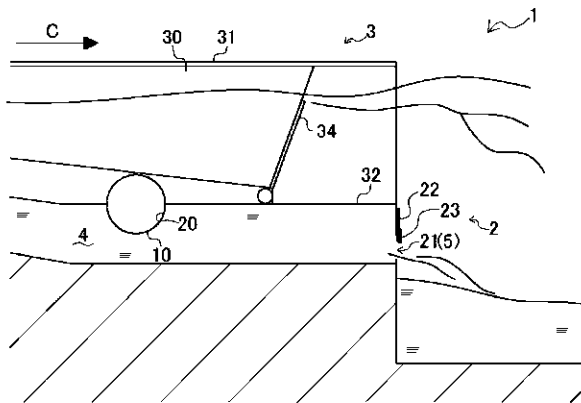
【図 3】



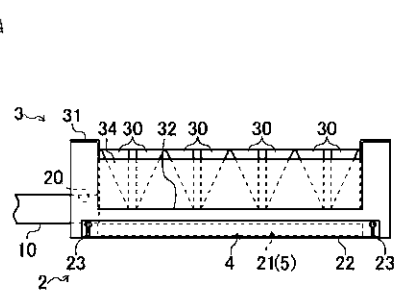
【図 4】



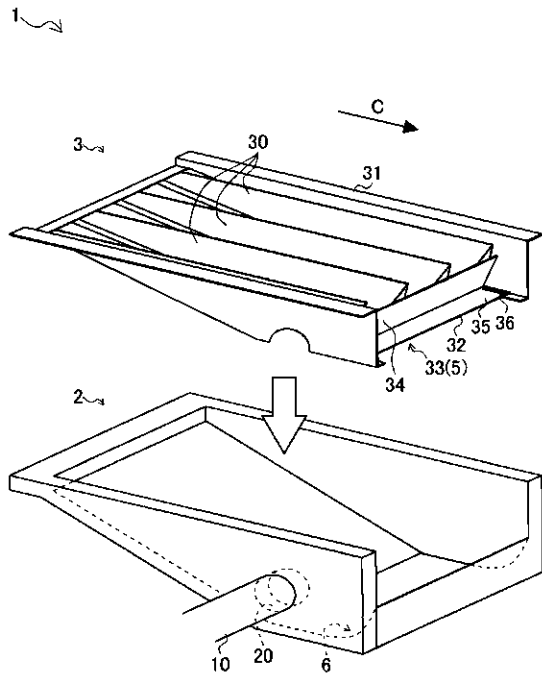
【図 5】



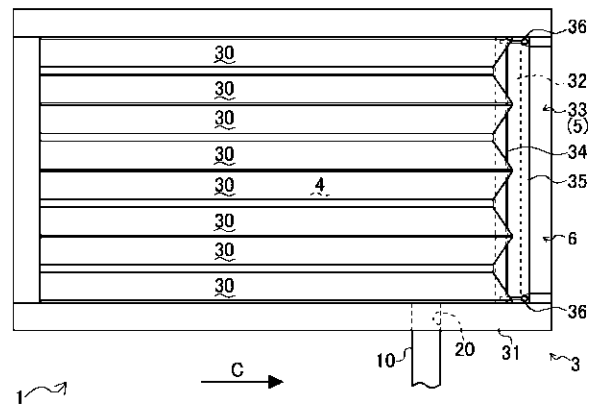
【図 6】



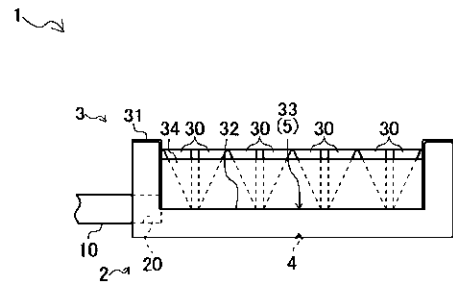
【図 7】



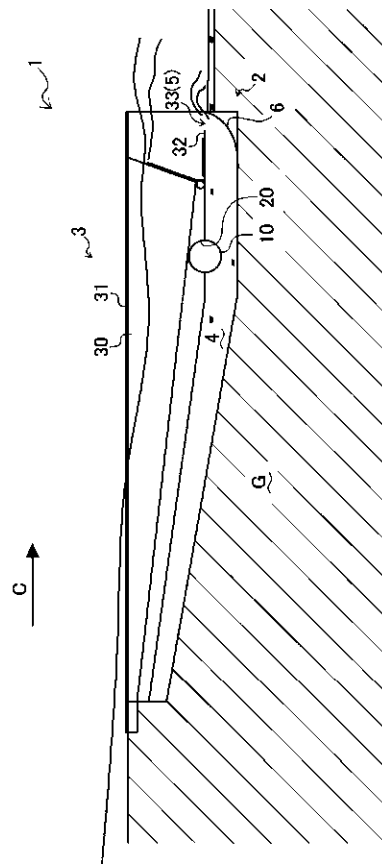
【図 8】



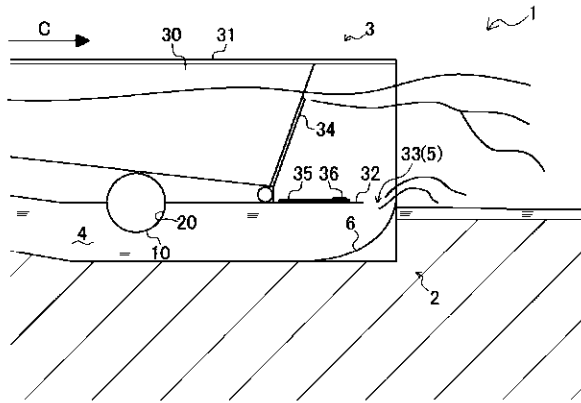
【図 9】



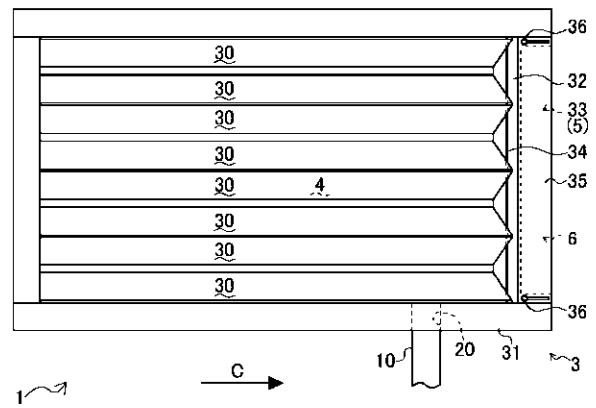
【図 10】



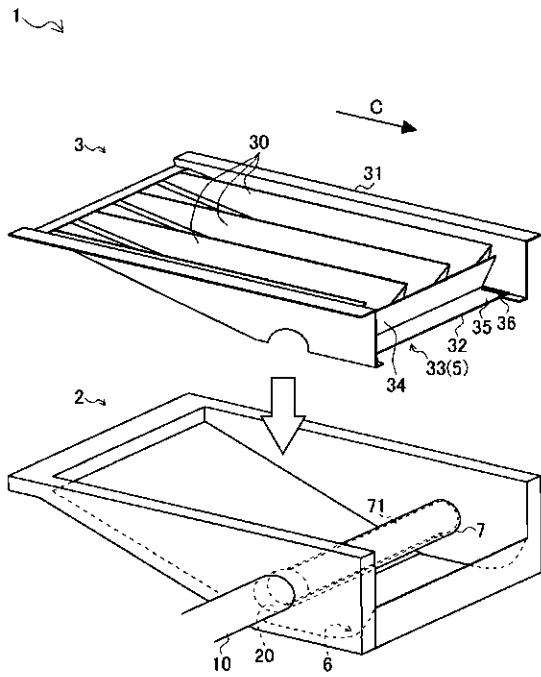
【図 1 1】



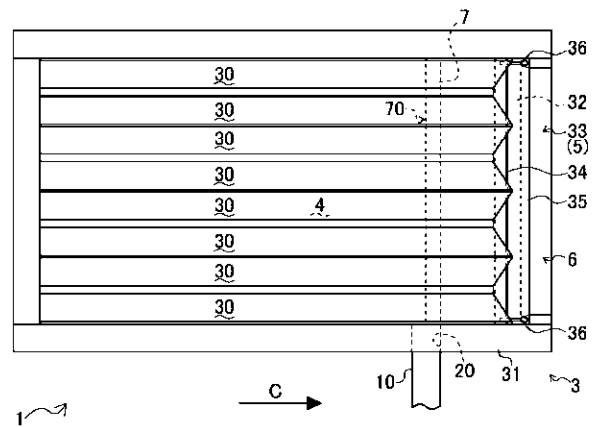
【図 1 2】



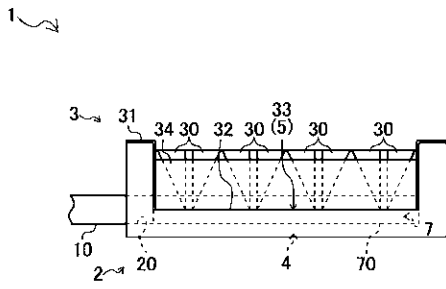
【図 1 3】



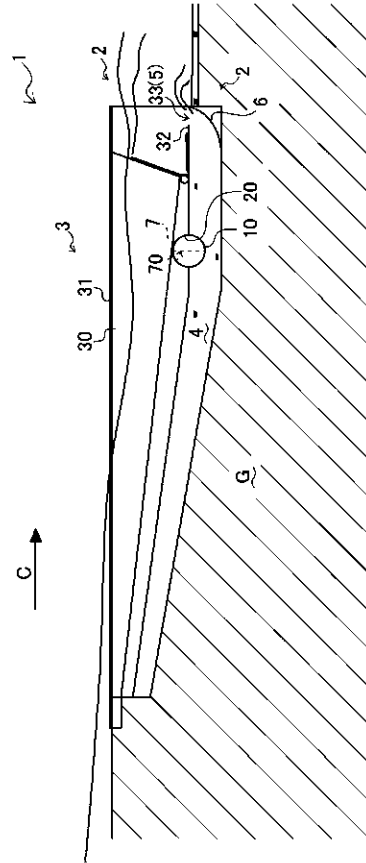
【図 1 4】



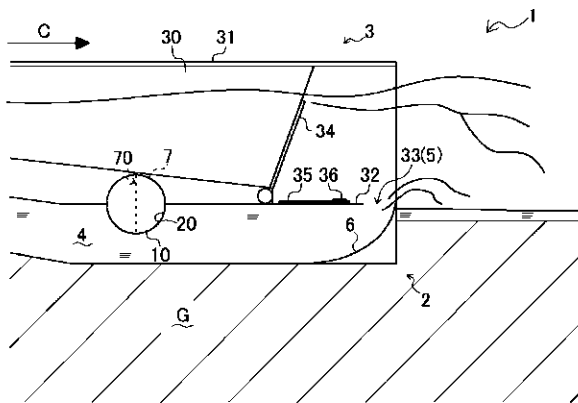
【図 15】



【図 16】



【図 17】





US 20140299528A1

(19) **United States**

(12) **Patent Application Publication**
Doyle et al.

(10) **Pub. No.: US 2014/0299528 A1**

(43) **Pub. Date: Oct. 9, 2014**

(54) **AQUATIC LIFE AND DEBRIS COLLECTION
DEVICE FOR A WATER SCREEN**

(52) **U.S. Cl.**
CPC **E02B 1/006** (2013.01)
USPC **210/170.09**

(71) Applicant: **LAITRAM, L.L.C.**, Harahan, LA (US)

(72) Inventors: **Ross Doyle**, Mandeville, LA (US);
Timothy A. Woodrow, New Orleans,
LA (US); **Mitchell G. Pansano, JR.**,
Harahan, LA (US); **John C. Hawkins,
JR.**, Mandeville, LA (US)

(73) Assignee: **Laitram, L.L.C.**, Harahan, LA (US)

(21) Appl. No.: **13/856,247**

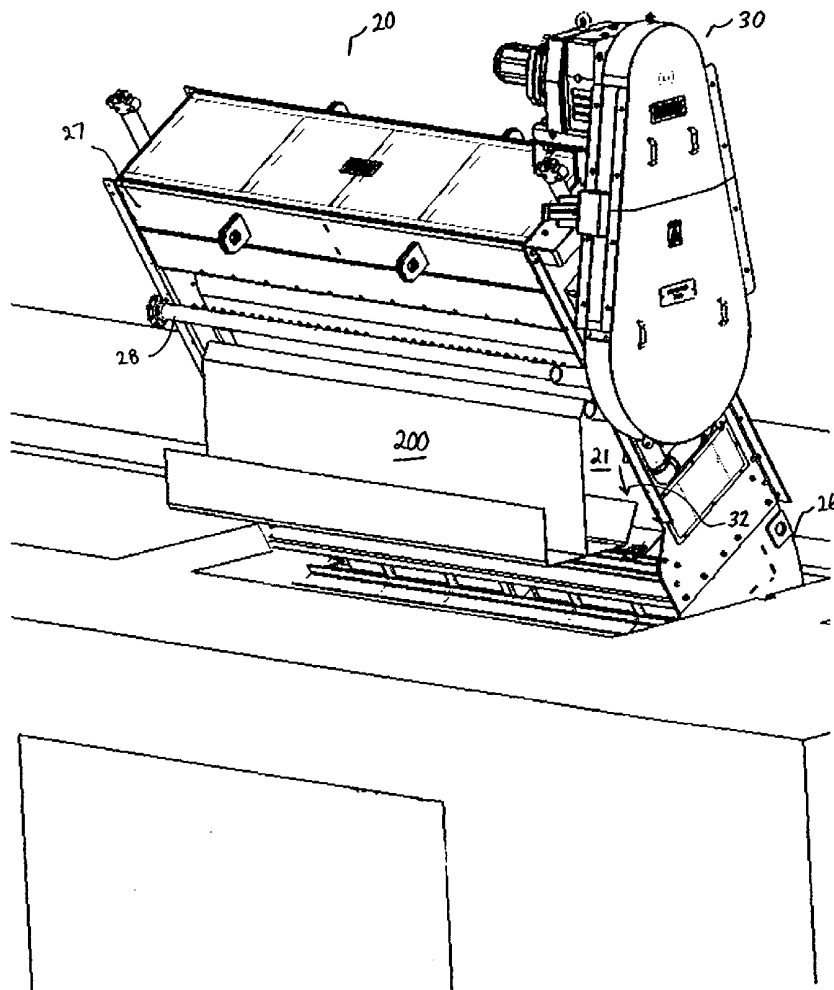
(22) Filed: **Apr. 3, 2013**

Publication Classification

(51) **Int. Cl.**
E02B 1/00 (2006.01)

(57) **ABSTRACT**

A collection device for aquatic life and debris for a traveling water screen. The collection device allows sharing of water provided from a high pressure nozzle while shielding aquatic life from a high pressure spray produced by the high pressure nozzle. The collection device enables separate collection of items exposed to a high pressure spray and items protected from a high pressure spray while reducing water costs. The collection device includes a first compartment for collecting aquatic life collected by a water screen and a second compartment for collecting debris collected by the water screen. A shield dissipates or blocks a high pressure spray directed into the second compartment from entering the first compartment. A filter allows fluid to flow from the second compartment into the first compartment while blocking aquatic life in the first compartment from entering the second compartment.



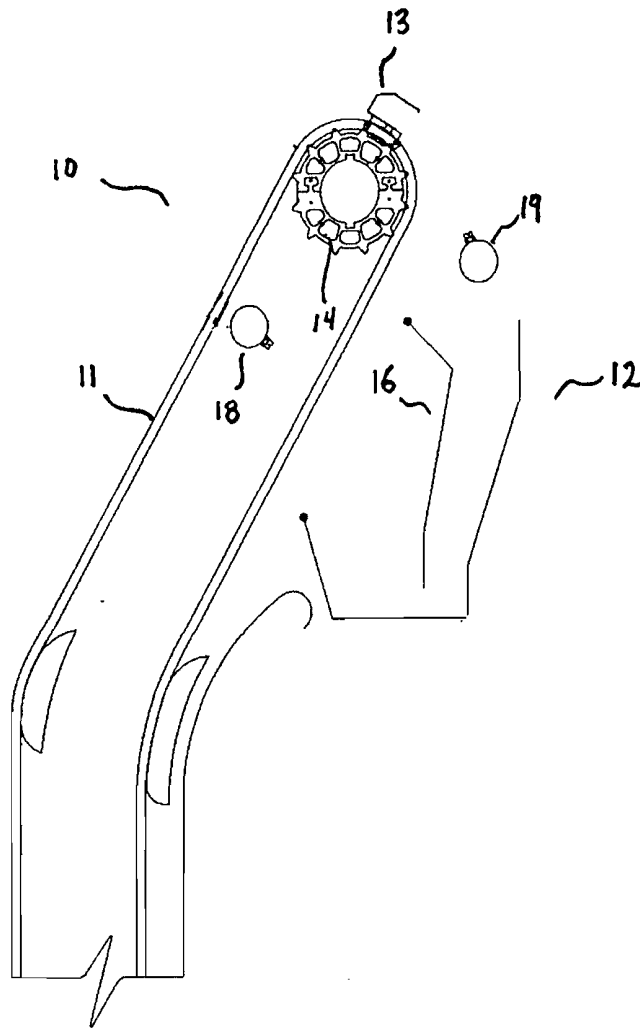


FIG. 1 (PRIOR ART)

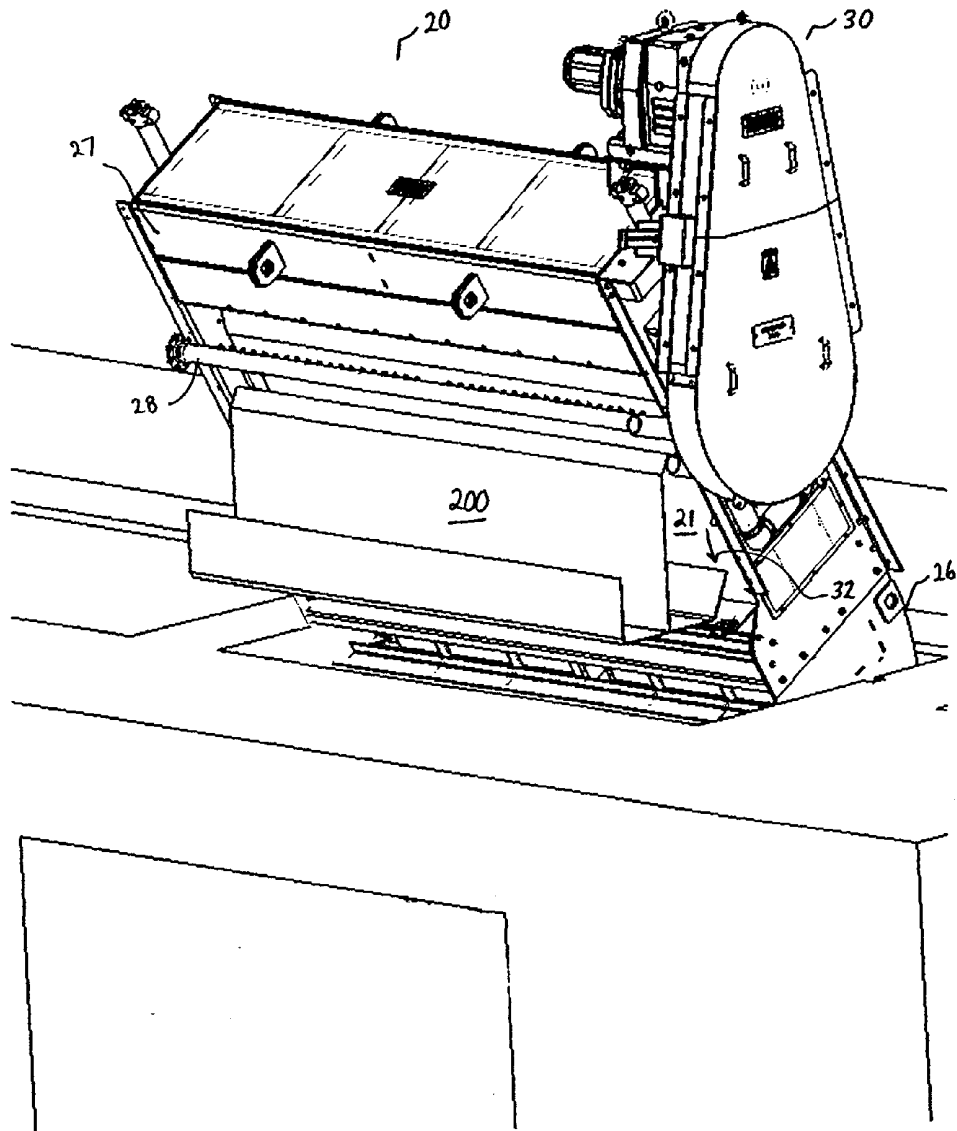


FIG. 2A

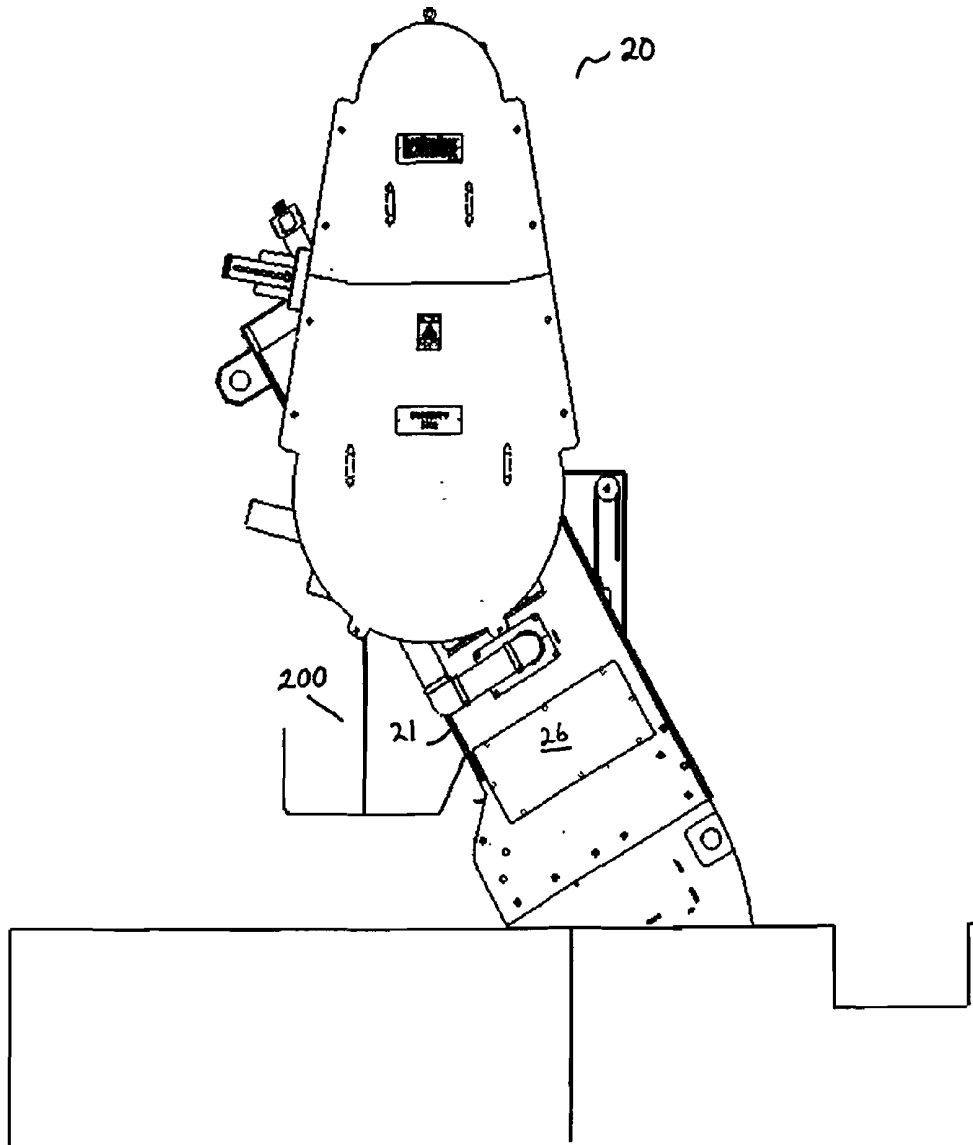


FIG. 2B

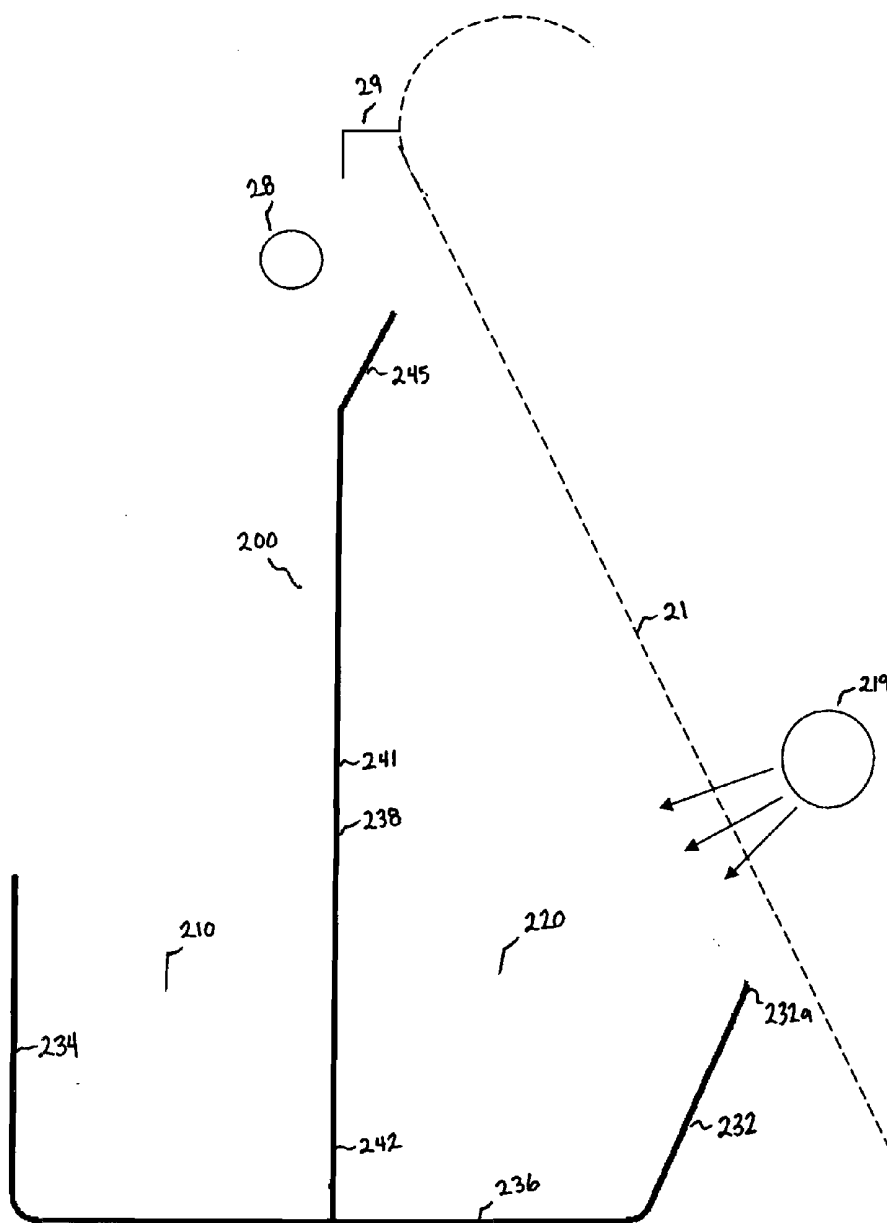


FIG. 3A

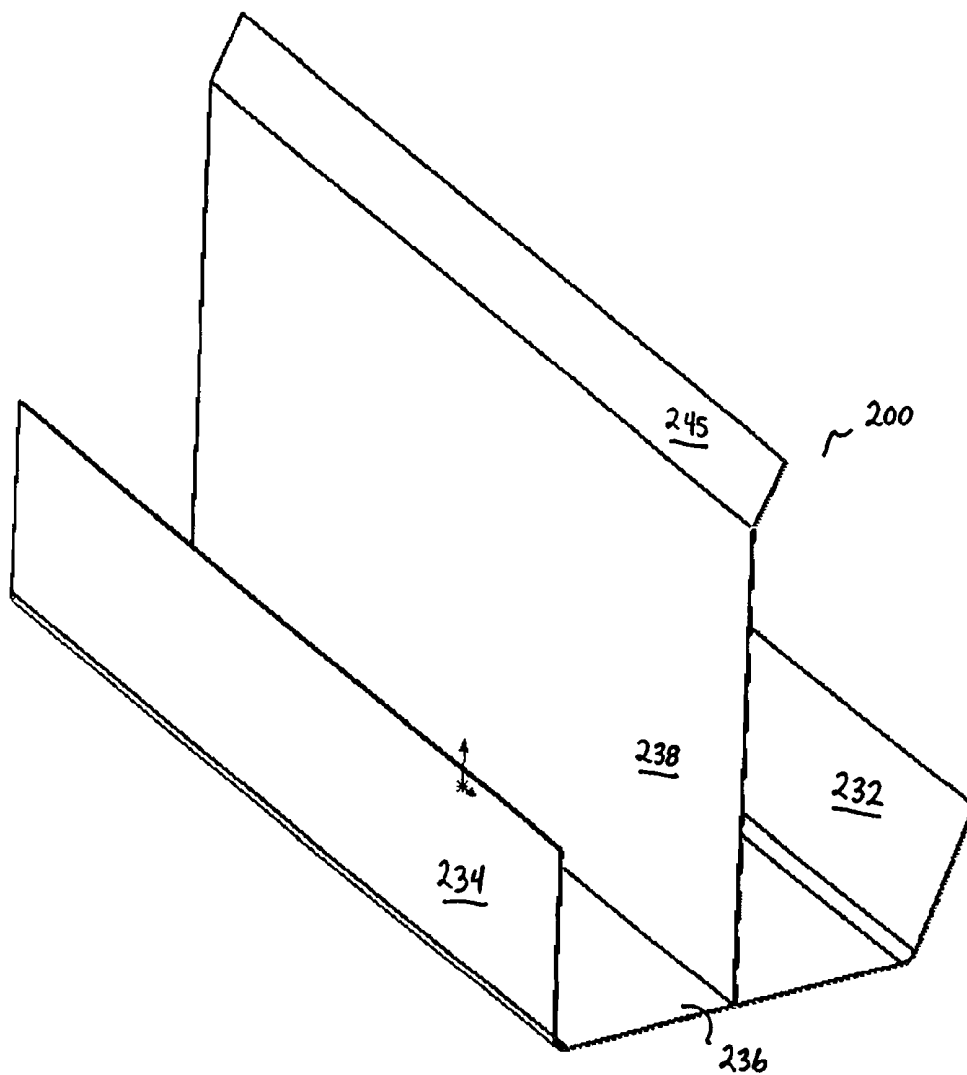


FIG. 3B

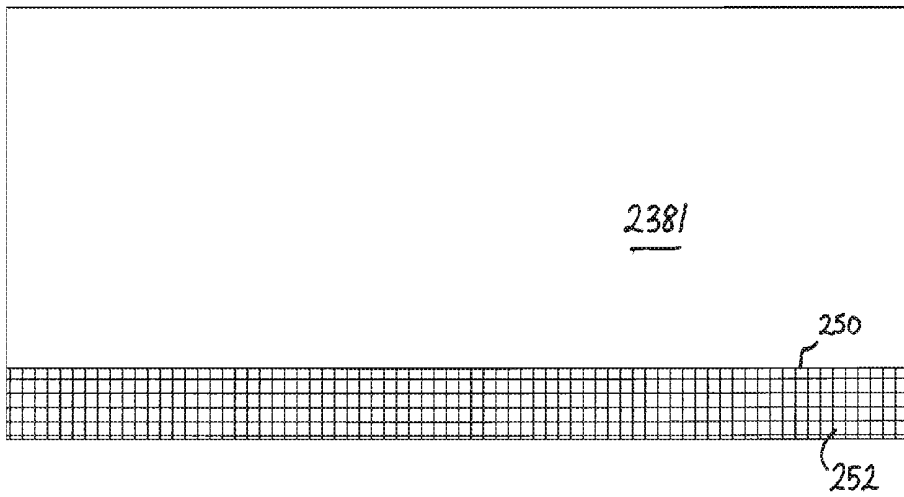


FIG. 4

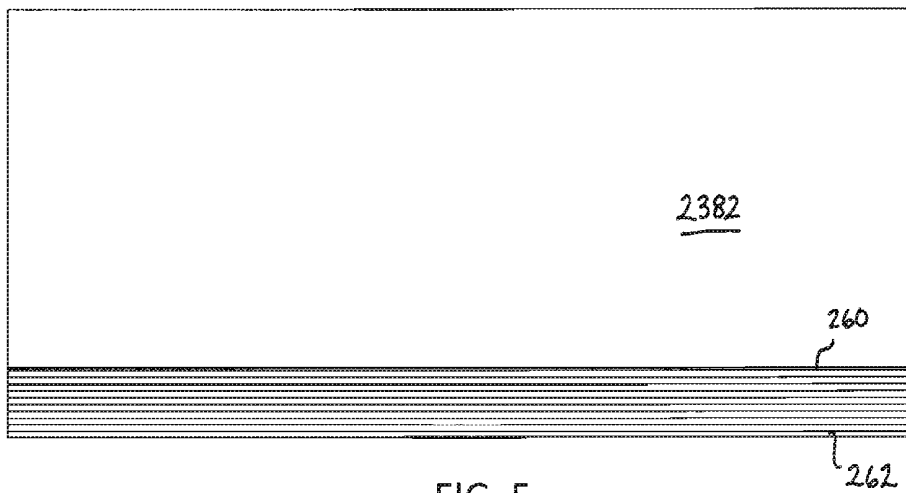


FIG. 5

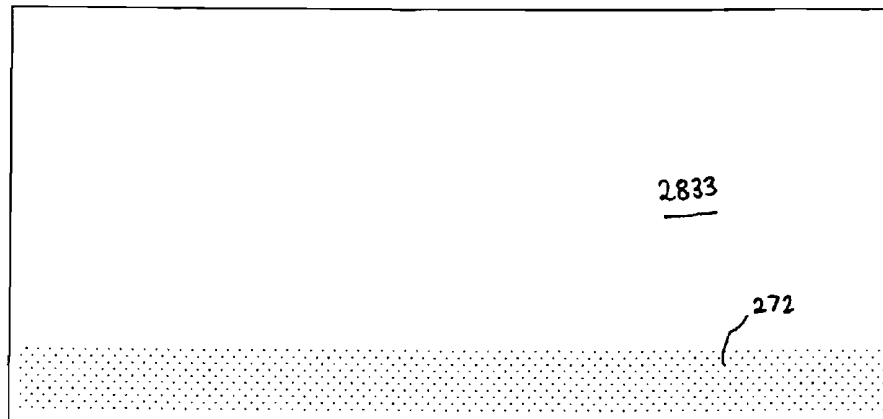


FIG. 6

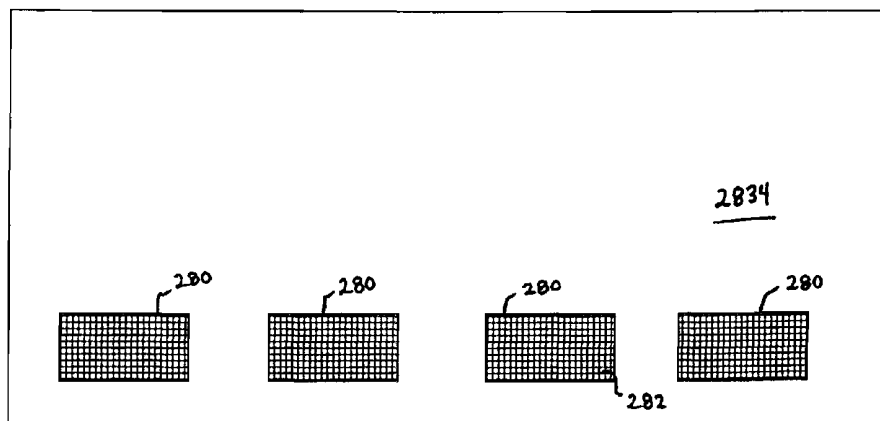


FIG. 7

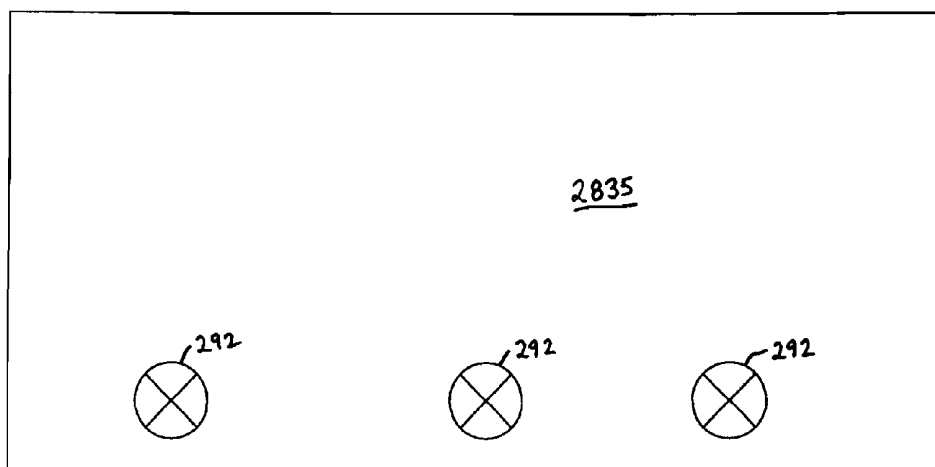


FIG. 8

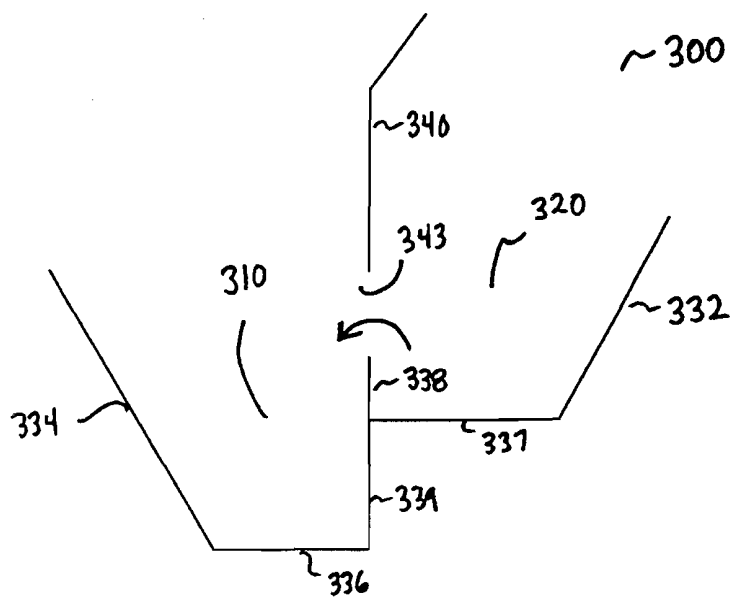


FIG. 9

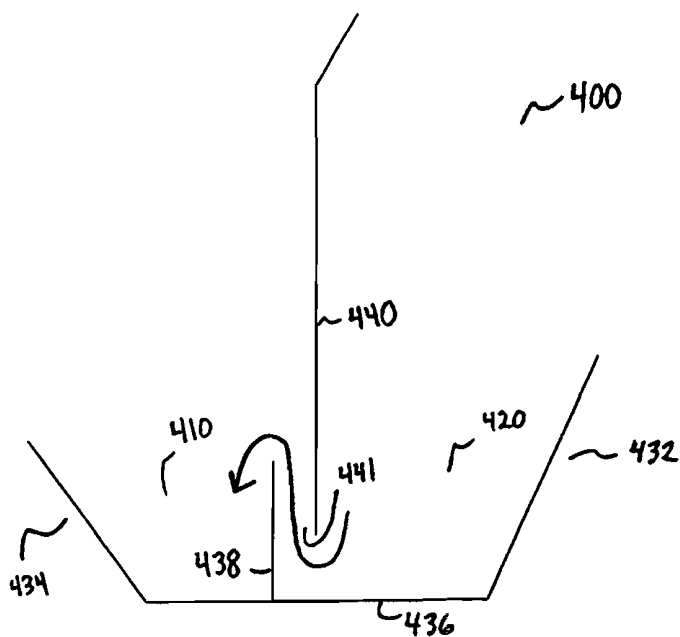


FIG. 10

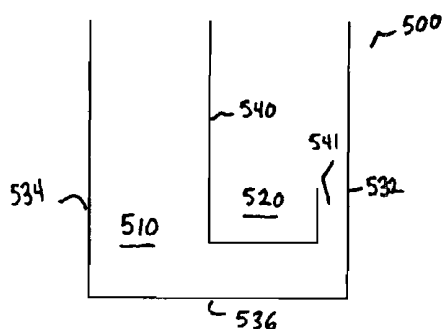


FIG. 11A

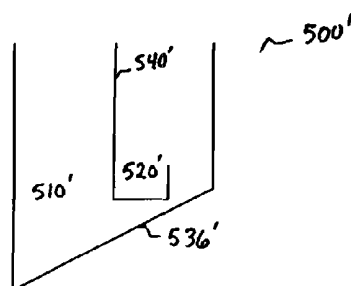


FIG. 11B

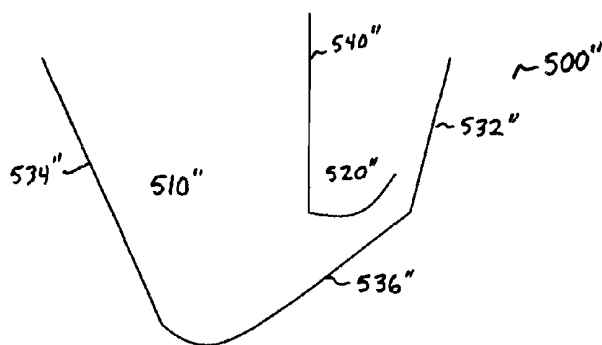


FIG. 11C

FIG. 12

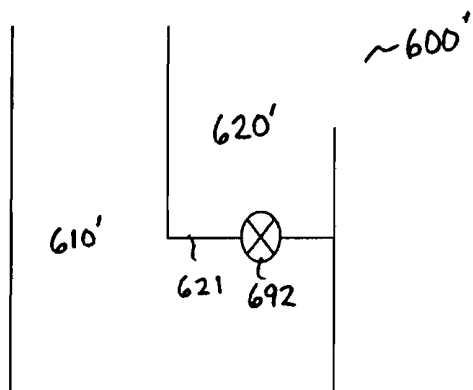
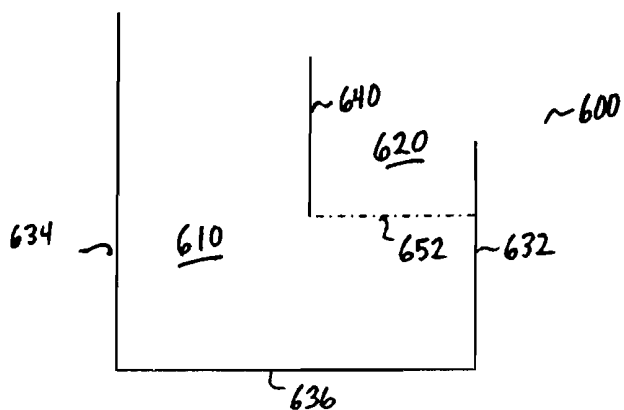


FIG. 13

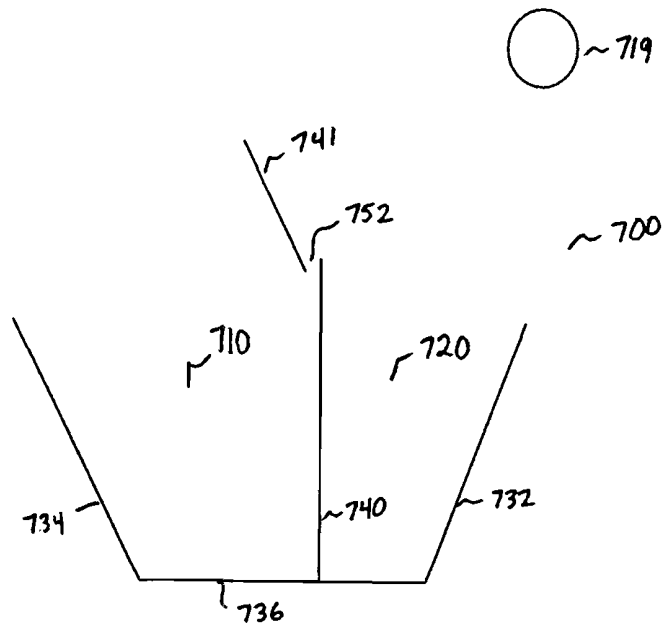


FIG. 14

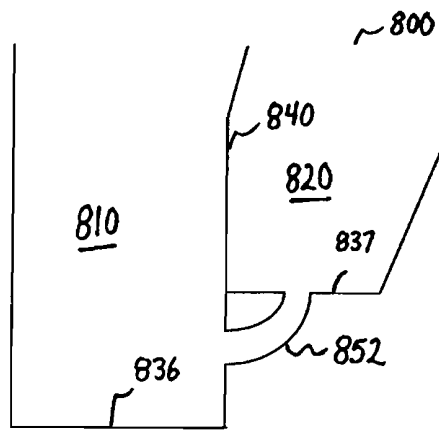


FIG. 15A

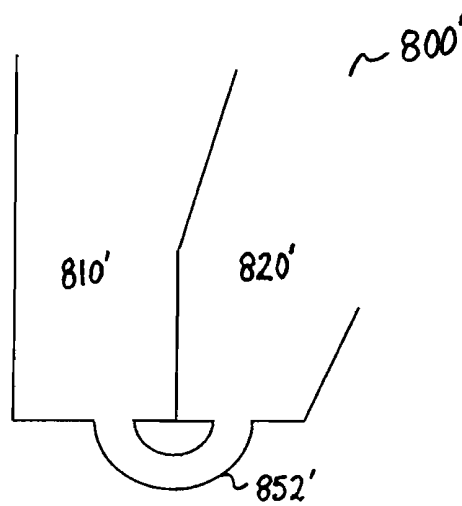


FIG. 15B

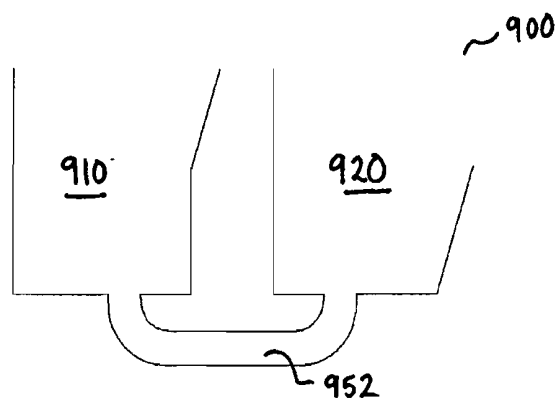


FIG. 16A

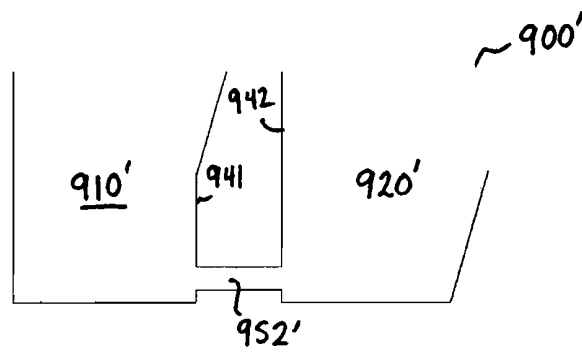


FIG. 16B

AQUATIC LIFE AND DEBRIS COLLECTION DEVICE FOR A WATER SCREEN

BACKGROUND

[0001] The present invention relates generally to water screens and, more particularly, to traveling water screen systems with collection devices for collecting aquatic life and debris trapped by a water screen.

[0002] Water drawn into an industrial plant from a lake or river must be filtered to prevent debris from fouling equipment and causing damage and to protect aquatic life in the lake or river from damage. Traveling water screens are used to filter out and remove debris and aquatic life from an influent channel before the debris can enter the plant or fish impinged on the upstream face of the screen die. A typical traveling water screen comprises a motor-driven screen, such as a foraminous conveyor belt, extending laterally across the width of the channel and vertically from the bottom of the channel to a height above the level of the water to ensure that all the water flowing in the channel passes through the screen. The water screen travels a circuitous path around a motor-driven head shaft above the level of the water and a lower idle shaft in a boot section of the water screen at the bottom of the channel. The screen travels upward along the upstream portion of its circuitous path and downward along the downstream portion. A series of lift elements, such as baskets, scoops, or flights, extending outward of the screen at periodic intervals along its length lift debris or fish trapped on the upward-moving upstream portion of the water screen out of the channel for disposal in the case of debris and safe transit in the case of fish.

[0003] A variety of different types of traveling water screen systems is known, including “through-flow pattern” (“transverse flow”), “out-to-in flow pattern” (“dual flow”) and “in-to-out flow pattern” (“center flow”) types. In the “through-flow pattern” type, the screen panels are arranged transversely to the direction of flow of the sluice channel and the screen panels that move downwardly are arranged behind the upwardly moving screen panels in the direction of flow. In the “out-to-in flow pattern” and “in-to-out flow pattern” types of construction, the screen panels are arranged in the direction of flow of the sluice channel. In the “out-to-in flow pattern” type of construction, the contaminated water side is the outside of the upwardly and downwardly moving sections and the clean water side is the interior space between the two sections; the opposite is the case for the “in-to-out flow pattern” type of construction.

[0004] For fish handling water screen applications, it is current practice to have a dedicated collection trough for fish and a separate collection trough for debris, as shown in U.S. Pat. No. 8,092,674, the contents of which are incorporated herein by reference. The use of separate collection troughs prevents damage to fish by the high pressure spray water used to clean debris from the water screen.

[0005] FIG. 1 shows another water screen system of the prior art 10, comprising a water screen 11 driven by a sprocket 14 and having fish buckets 13 for collecting aquatic life. The water screen includes a trough 12 for collecting the aquatic life and debris trapped by the water screen. The trough 12 comprises a single trough for collecting and combining both aquatic life and debris from the water screen, and a deflector 16 suspended in the trough. A high pressure spray nozzle 18 directs high pressure water through the water screen 11 to push debris trapped by the water screen into the trough 12. A

lower pressure spray nozzle 19 provides water for aquatic life dumped by the fish buckets. The deflector 16 blocks the high pressure spray from harming fish falling into the trough from the fish buckets 13. Water, fish, debris and other collected items freely flow below the deflector 16 across the width of the trough 12 and are collected together.

SUMMARY

[0006] An embodiment of the present invention provides a collection device for a water screen. The collection device separately collects aquatic life and debris from the water screen in separate compartments, while allowing water to flow between the two compartments. The contents of each compartment may be separately collected for analysis or reporting purposes. The collection device prevents aquatic life in one compartment from entering another compartment.

[0007] According to one aspect, a collection device for aquatic life and debris trapped by a water screen comprises a first compartment for collecting aquatic life trapped by the water screen, a second compartment for collecting debris trapped by the water screen, the second compartment exposed to a high pressure spray from a high pressure spray emitter, a shield for shielding the first compartment from the high pressure spray and a filter for allowing fluid flow from the second compartment to the first compartment while preventing aquatic life collected by the first compartment from entering the second compartment.

[0008] According to another aspect, a collection device for aquatic life and debris trapped by a water screen comprises a first side wall, a second side wall, a bottom wall extending between the first side wall and the second side wall, a divider extending into a space between the first side wall and the second side wall to define a first compartment and a second compartment and a filter in the divider for allowing the passage of fluid through the divider while preventing the flow of aquatic life through the divider.

[0009] According to another aspect, a collection device for aquatic life and debris trapped by a water screen comprises a first compartment for receiving aquatic life trapped by the water screen a second compartment adjacent to the first compartment for receiving debris trapped by the water screen and a divider separating the first compartment from the second compartment. The divider comprises a wall including a plurality of openings for placing the first compartment in fluid communication with the second compartment.

[0010] According to a final aspect, a water screen system comprises a traveling water screen including lift elements, a high pressure nozzle for applying a high pressure fluid spray to the water screen to release debris from the water screen and a collection device for collecting aquatic life and debris collected by the water screen. The collection device comprises a first compartment for collecting aquatic life from the lift elements, a second compartment for collecting debris from the water screen released by the high pressure fluid spray, and a filter for allowing fluid flow from the second compartment to the first compartment while preventing aquatic life from entering the second compartment from the first compartment.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] These aspects and features of the invention, as well as its advantages, are explained in more detail in the following description, appended claims, and accompanying drawings, in which:

[0012] FIG. 1 is a side view of a prior water screen including a collection device;

[0013] FIG. 2A is an isometric view of a water screen system employing a collection device according to an illustrative embodiment of the invention;

[0014] FIG. 2B is a side view of the water screen system of FIG. 2A;

[0015] FIG. 3A is a side view of the collection device of FIG. 2A;

[0016] FIG. 3B is an isometric view of the collection device of FIG. 3A;

[0017] FIG. 4 is a front view of a dividing wall including mesh for a collection device of one embodiment of the invention;

[0018] FIG. 5 is a front view of a dividing wall for a collection device according to another embodiment of the invention;

[0019] FIG. 6 is a front view of a dividing wall for a collection device according to another embodiment of the invention;

[0020] FIG. 7 is a front view of a dividing wall for a collection device according to another embodiment of the invention;

[0021] FIG. 8 is a front view of a dividing wall for a collection device including valves according to another embodiment of the invention;

[0022] FIG. 9 is a side view of a collection device including separate compartments, a shield and a filter comprising a gate according to another embodiment of the invention;

[0023] FIG. 10 is a side view of a collection device including separate compartments, a shield and a filter comprising a serpentine passageway according to another embodiment of the invention;

[0024] FIG. 11A is a side view of a collection device including a j-shaped shield according to another embodiment of the invention;

[0025] FIG. 11B is a side view of another embodiment of a collection device including a j-shaped shield and angled bottom wall;

[0026] FIG. 11C is a side view of a collection device having a j-shaped shield, curved and angled walls according to another embodiment of the invention;

[0027] FIG. 12 is a cross-sectional view of a collection device including a mesh filter in the floor of one compartment for allowing fluid communication between separate compartments of the collection device according to another embodiment of the invention;

[0028] FIG. 13 is a side view of a collection device including a valve in the floor of one compartment for allowing fluid to flow from one compartment to another compartment;

[0029] FIG. 14 is a side view of a collection device including a dividing wall, a deflecting shield and a gate for allowing fluid to pass into one compartment from another;

[0030] FIG. 15A is a side view of a collection device including a filter comprising a pipe;

[0031] FIG. 15B is a side view of a collection device including a filter comprising a pipe according to another embodiment of the invention;

[0032] FIG. 16A is a side view of a collection device including nonadjacent compartments connected by a filter according to another embodiment of the invention; and

[0033] FIG. 16B is a side view of another collection device including nonadjacent compartments connected by a filter.

DETAILED DESCRIPTION

[0034] An embodiment of the present invention provides a collection device for a water screen that allows sharing of water provided from a high pressure nozzle while shielding aquatic life from a high pressure spray produced by the high pressure nozzle. The collection device enables separate collection of items exposed to a high pressure spray and items protected from a high pressure spray while reducing water costs. The invention will be described relative to certain illustrative embodiments. Those skilled in the art will recognize that the invention is not limited to the illustrative embodiments, and that variations may be made.

[0035] As used herein, the term “filter” refers to any device that allows passage of fluid in at least a first direction while preventing the passage of aquatic life in a second direction. Examples of suitable filters include mesh, a gate, openings of a certain size, a wire grid, profile bar, a drain, a valve, a pipe, and other devices known in the art.

[0036] The word “fish” as used herein includes all aquatic life, including, but not limited to fish, crustaceans and amphibians, as well as the eggs and larvae of fish, crustaceans and amphibians present in the water being filtered by a water screen.

[0037] The term “high pressure spray” refers to a spray suitable for removing debris impinged on a water screen, and generally has a pressure greater than about 50 pounds per square inch.

[0038] An embodiment of an aquatic life and debris collection device includes a first compartment for collecting aquatic life, usually deposited from a lift element on a water screen, such as a fish bucket. A second compartment collects debris trapped by the water screen. A nozzle or spray header comprising a collection of nozzles directs a high pressure water spray through the water screen to push debris from the water screen into the second compartment. The contents of each compartment can be separately collected and tested. A shield protects the contents of the first compartment from the high pressure spray. A filter allows water to flow from the second compartment into the first compartment while preventing aquatic life from flowing from the first compartment into the second compartment. In this manner, the collection device protects aquatic life while reducing water usage.

[0039] FIGS. 2A and 2B illustrate a water screen system 20 employing a collection device 200 of an illustrative embodiment of the invention. FIG. 3A is a schematic side view of the collection device, showing the relative placement of the collection device with respect to the water screen 21, and FIG. 3B is an isometric view of the collection device. The illustrative system 20 is a “transverse flow, vertically traveling” water screen, but the collection device 200 may be implemented in any suitable type of system for screening debris and aquatic life. The water screen system 20 includes a vertically traveling water screen 21 in the form of an endless modular conveyor belt loop entrained between upper and lower sprocket sets on drive and idle shafts. The screen includes fish buckets 29 or other lift elements for collecting aquatic life. The system 20 further includes a frame 26 for mounting the water screen 21. The upper sprocket set is housed in a head portion 27.

[0040] The illustrative modular plastic conveyor belt 21 is constructed of a series of rows of belt modules. Consecutive rows are joined together in a hinge joint by a hinge pin received in a lateral passageway through interleaved hinge eyes of consecutive rows. Teeth on the sprockets engage drive

structure in the inner side of the belt. A drive motor **30** at one end of the belt, illustrated as the upper end, is coupled to the drive shaft to drive the belt in normal operating conditions in the direction given by arrow **32**. Alternatively, the belt could be a flat perforated or mesh rubber belt driven between pulleys. Multiple perforations, or openings, make the belt foraminous and suitable for use as a water screen. Examples of suitable belts and buckets for use in a water screen system are described in U.S. Pat. Nos. 7,048,850, 7,300,572, 7,393,451, 7,722,762, 7,776,212, 6,187,184 and 7,575,113 and 8,092,674, which are herein incorporated by reference.

[0041] As shown in FIG. 3A, a high pressure spray emitter, such as a nozzle **219**, is disposed within the water screen **21** downstream of the head **27** for directing high pressure spray through the water screen to release debris collected by the water screen. An optional low pressure spray emitter **28** is disposed downstream of the head on the outside of the water screen **21** for rinsing the fish buckets **29** and/or adding water to aquatic life dumped by the lift elements into the collection device **200**. The low pressure spray emitter **28** generally supplies a spray at a pressure that is less than about 45 pounds per square inch, though the invention is not so limited.

[0042] The illustrative collection device **200**, illustrated as a double trough, is disposed on the downstream side of the head **27** housing an upper sprocket. However, a collection device of an embodiment of the invention may be located in any suitable location. For example, the collection device may alternatively be located within the water screen for an in-to-outflow type of water screen, such as described in U.S. Pat. No. 8,092,674.

[0043] Referring to FIGS. 3A and 3B, the collection device **200** includes a first compartment, illustrated as a first trough **210**, for collecting a first set of items, such as aquatic life in water flow, and a second compartment **220** for collecting a second set of items, such as debris in water flow. The illustrative compartments **210**, **220** are adjacent, though the invention is not so limited, and the compartments may be nonadjacent to and/or separate from each other. The collection device **200** includes a front wall **232**, a rear wall **234**, a bottom wall **236** and a dividing wall **238** extending upwards from the bottom wall **236**. Preferably, the tip **232a** of the front wall is close to the water screen **21** so that the second compartment is adjacent to the outside of the water screen. The dividing wall **238** includes a top portion **241** forming a shield for shielding items in the first compartment from a high pressure spray emitted by the high pressure nozzle **219**. The illustrative top portion **241** is substantially impervious to fluid flow to shield the items in the first trough **210** from a high pressure spray. A lower portion **242** comprises a filter, embodiments of which are described below, to allow fluid provided by the high pressure nozzle, or otherwise present in the second trough **220**, to pass at a lower pressure into the first trough **210**. The lower portion **242** is impervious to solids, so that fish, fish eggs or other items are prevented from passing into the second trough **220** from the first trough **210**. In this manner, the contents of the first compartment and the second compartment may be separately collected, while ensuring sufficient water supply for promoting the survival of aquatic life collected in the first compartment.

[0044] In the illustrative embodiment, the dividing wall **238** includes a bent upper portion **245** to help guide fish from a fish bucket **29** into the first compartment **210**. The tip of the bent upper portion **245** may be aligned with the inside edge of the fish bucket to ensure that fish enter the first compartment

when dumped from the fish bucket. The walls forming the compartments **210**, **220** may be straight, angled, corrugated, curved, serpentine, or have any suitable configuration and are not limited to the illustrative embodiment. The walls may be shaped to promote fluid flow, aquatic life survival or another desired outcome.

[0045] A high pressure spray emitted by the nozzle **219** within the water screen **21** releases debris from the water screen. The debris falls into the second compartment **220**, along with the water. The shield **241** blocks or dissipates the flow of water from the high pressure nozzle to protect aquatic life dumped into the first compartment **210** from a fish bucket. Water is allowed to flow through the lower portion **242** into the first compartment to reduce the necessity of a separate or high volume water supply for the aquatic life in the first compartment.

[0046] The troughs **210**, **220** can flow in the same direction or may flow in opposite directions.

[0047] Referring to FIG. 4, in one embodiment, an embodiment of a dividing wall **2381** including a filter for a collection device comprises a window **250** extending along the length of the dividing wall formed of or filled with mesh **252**. The mesh **250** may extend to the bottom, or be at an intermediate location of the dividing wall **2381**. The mesh may have any density or porosity and may be formed of any material suitable for blocking the passage of aquatic life while allowing the passage of water therethrough. For example, in one embodiment, the mesh is a #8 mesh with openings less than about $\frac{3}{32}$ " to sufficiently block the passage of aquatic life. The upper portion of the dividing wall **2381** blocks or dissipates high pressure spray from damaging aquatic life across the dividing wall **2381**.

[0048] In another embodiment, shown in FIG. 5, a filter in a dividing wall **2832** of a collection device comprises a window **260** filled with profile bar or wedge wire **262** for allowing fluid flow while blocking the passage of aquatic life. The upper portion of the dividing wall **2382** blocks or dissipates high pressure spray from damaging aquatic life across the dividing wall **2382**.

[0049] In another embodiment, shown in FIG. 6, the collection device filter may comprise perforations **272** or other openings of any suitable size, shape, density and configuration in the dividing wall **2833** defining first and second compartments for allowing fluid flow therebetween, while blocking the passage of aquatic life. The upper portion of the dividing wall **2383** forms a shield that blocks or dissipates high pressure spray from damaging aquatic life across the dividing wall **2383**.

[0050] As shown in FIG. 7, the collection device filter may comprise mesh **282** disposed in one or more smaller windows **280** in a dividing wall **2834**. The windows **280** may have any suitable size, shape, number or configuration.

[0051] In another embodiment, shown in FIG. 8, the collection device filter may comprise one or more valves **292** disposed in a dividing wall **2835** for allowing fluid flow through the dividing wall **2835** while blocking the passage of aquatic life from the first compartment to the second compartment divided by the dividing wall.

[0052] FIG. 9 is a side view of another embodiment of a collection device **300** suitable for protecting aquatic life while reducing water usage in a water screen system. The collection device **300** includes a front wall **332**, a rear wall **334**, a first bottom wall **336** intersecting the front wall, a second bottom wall **337** intersecting the rear wall **334**, and a dividing wall,

illustrated as a lip 338 extending upwards from one of the bottom walls 337. The collection device 300 thus forms two compartments: a first compartment 310, such as a trough, for collecting aquatic life deposited from a fish buckets and a second compartment 320, such as a trough, for collecting debris released from a water screen by a high pressure spray. In the illustrative embodiment, the first bottom wall 336 is lower than the second bottom wall 337 and connected by a connecting wall 339, so that the first compartment 310 is lower than the second compartment 320 to facilitate fluid flow towards the first compartment from the second. A shield 340 extends into the space between the front wall and rear wall to protect the first compartment 310 from high pressure spray directed to the second compartment 320.

[0053] The collection device 300 further includes a filter, illustrated as a space 343 formed between the shield 340 and lip 338 that forms a gate to regulate flow between the two compartments. The gate allows water to flow from the second compartment 320 into the first compartment, while preventing aquatic life from flowing from the first compartment into the second compartment.

[0054] The walls of the collection device 300 may be straight, angled, curved, corrugated or otherwise configured to promote fluid flow, aquatic life survival or another desired outcome.

[0055] FIG. 10 illustrates another embodiment of a collection device 400 suitable for protecting aquatic life while reducing water usage. The collection device 400 comprises a front wall 432, a rear wall 434, a bottom wall 436, a divider for separating the collection device into a first compartment 410 and a second compartment 420, a shield for shielding the first compartment from a high pressure spray directed to the second compartment and a filter for allowing fluid to flow from the second compartment into the first. In the embodiment of FIG. 10, the divider, shield and filter are formed by a lip 438 extending upwards from the bottom wall 436 and a suspended wall 440 extending downwards between the front wall and rear wall. The lip 438 and suspended wall 440 are offset in the horizontal direction and overlapping in the vertical direction so as to form a serpentine passageway 441. The serpentine passageway is a gate that allows the passage of fluid from the second compartment 420 into the first compartment 410, while preventing fish from passing from the first compartment into the second.

[0056] FIGS. 11A-11C show various embodiments of a collection device including a j-shaped shield that forms a compartment within a larger compartment. In the embodiment of FIG. 11A, a collection device 500 comprises a front wall 532, a rear wall 534 and a bottom wall 536. A j-shaped wall 540 extends into the space between the front wall 532 and rear wall 534 to divide the space into a first compartment 510 for collecting aquatic life and a second compartment 520 in the hook of the "j" for collecting debris. The j-shaped shield 540 protects aquatic life in the first compartment from a high pressure spray in the second compartment. Water can spill from the second compartment 520 into the first via opening 541, which forms a filter, while aquatic life is prevented from passing from the first compartment 510 into the second compartment 520.

[0057] As shown in FIG. 11B, the collection device 500' including a j-shaped shield 540' may include an angled bottom wall 536' to facilitate fluid flow into the first compartment 510' and inhibiting the flow of aquatic life from the first compartment 510' to the second compartment 520'.

[0058] As shown in FIG. 11C, the front wall 532" and/or rear wall 534" of a collection device may be angled to facilitate deposition of the aquatic life and debris into the compartments 510" and 520". In addition, the second compartment 520" may have a curved bottom formed by the j-shaped shield 540". In the embodiment of FIG. 11C, the bottom wall 536" of the collection device 500 is also curved.

[0059] FIG. 12 illustrates another embodiment of a collection device 600 that allows for separate collection of the contents of two compartments, while allowing sharing of water between the two compartments. The collection device 600 comprises a front wall 632, rear wall 634 and bottom wall 636. A shield 640, comprising a wall, extends into the space between the front wall 632 and rear wall 634. Together with a filter, illustrates a mesh 652 extending between the shield 640 and the front wall 632, the shield 640 forms a separate first compartment 610 and second compartment 620. The filter 652 defines at least a portion of the floor of the second compartment 620. The first compartment 610 collects aquatic life from lift elements of an associated water screen and the second compartment 620 collects debris pushed from the water screen by a high pressure spray. The shield 640 protects aquatic life from the high pressure spray. Water passes from the second compartment 620 into the first compartment through the mesh filter 652.

[0060] In another embodiment, shown in FIG. 13, a collection device 600' includes a valve 692 or other suitable device forming a filter in the floor 621 of the second compartment 620' dividing a first compartment 610' from a second compartment 620'.

[0061] FIG. 14 illustrates another embodiment of a collection device 700 of an embodiment of the invention. The collection device 700 includes a first compartment 710 for collecting aquatic life, and a second compartment for collecting debris from a water screen. The compartments are formed by a front wall 732, bottom wall 736, rear wall 734 and central dividing wall 740 extending from the bottom wall 736. A deflecting wall 741 deflects high pressure spray directed into the second compartment 720 from a nozzle 719 to form a shield. The deflecting wall 741 and dividing wall 740 form a gate 752 to allow the passage of water, at a reduced pressure level, into the first compartment 710. The gate 752 and dividing wall 740 prevent aquatic life from passing from the first compartment 710 into the second compartment 720. Aquatic life can be collected from the first compartment 710 separately from debris collected from the second compartment 720.

[0062] In addition to the gate 752, the collection device 700 may include another type of filter for allowing the sharing of water between the two compartments 710, 710.

[0063] FIGS. 15A and 15B illustrate alternative embodiments of a collection device including a filter. FIG. 15A shows a collection device 800 comprising a first compartment 810, a second compartment 820 and a filter 852 comprising a pipe extending from the bottom of the second compartment 820 and connecting to the first compartment 810. The bottom wall 836 of the first compartment 810 is lower than bottom wall 837 of the second compartment 820 to facilitate fluid flow from the second compartment into the first, while preventing or limiting the flow of aquatic life from the first compartment into the second compartment. The illustrative pipe 852 is a simple link between the two compartments 810, 820 allowing water to seek its own level. The pipe could have any suitable configuration. In addition, the filter may com-

prise multiple pipes connecting the compartments. The pipe **852** may also include a secondary filter, such as a valve, mesh, screen or other device to block the flow of items, such as aquatic life and debris, through the pipe **852**. The pipe **852** may also be shaped in a P-Trap style configuration to ensure that the water does not equalize past a certain point, thereby maintaining a certain water level in at least one compartment.

[0064] A shield, comprising a dividing wall **840**, extends between the first compartment **810** and the second compartment **820**.

[0065] Referring to FIG. **15B**, the pipe **852'** forming a filter in a collection device **800'** may extend between the bottoms of the first compartment **810'** and second compartment **820'**. In the embodiment of FIG. **15B**, the compartments **810'** and **820'** are level with each other, though the invention is not so limited.

[0066] FIGS. **16A** and **16B** illustrate alternate embodiments of a collection device including a filter. In FIG. **16A**, a collection device **900** comprises a first compartment **910**, which may be a trough, and a second compartment **920**, which may also be a trough, separate from the first compartment. The first compartment **910** and second compartment **920** are not adjacent, and have separate side walls spaced from each other. The contents of the first compartment **910** are thus protected from a high pressure spray directed into the second compartment **920**. A filter, illustrated as a pipe **952**, extends between and connects compartments, allowing fluid to flow from the second compartment into the first, while preventing aquatic life from passing from the first compartment into the second compartment. The pipe may include a secondary filter, such as a valve, screen, mesh or other device. The illustrative pipe **952** extends below the compartments and connects the floors of the compartment, but the pipe **952** could be in any suitable location. For example, as shown in FIG. **16B**, a collection device **900'** may comprise a pipe **952'** extending between and connecting interior side walls of two compartments **910'** and **920'**.

[0067] The filter may be adjustable to vary the flow of water or another fluid from the second compartment to the first compartment in a collection device.

[0068] As these few examples suggest, the scope of the invention is meant to be defined by the claims and not limited to the details of the described versions.

What is claimed is:

1. A collection device for aquatic life and debris trapped by a water screen, comprising:

- a first compartment for collecting aquatic life trapped by the water screen;
- a second compartment for collecting debris trapped by the water screen, the second compartment exposed to a high pressure spray from a high pressure spray emitter;
- a shield for shielding the first compartment from the high pressure spray; and
- a filter for allowing fluid flow from the second compartment to the first compartment while preventing aquatic life collected by the first compartment from entering the second compartment.

2. The collection device of claim **1**, wherein the first compartment comprises a trough and the second compartment comprises a trough.

3. The collection device of claim **1**, wherein the filter comprises one of a mesh and wire.

4. The collection device of claim **1**, wherein the filter comprises a pipe.

5. The collection device of claim **1**, wherein the shield comprises a dividing wall separating the first compartment from the second compartment, and the filter comprises a plurality of openings in the dividing wall.

6. The collection device of claim **1**, wherein the shield comprises a dividing wall separating the first compartment from the second compartment, and the filter comprises a valve in the dividing wall.

7. The collection device of claim **1**, wherein the shield comprises a j-shaped wall dividing the first compartment from the second compartment, and the filter comprises an opening between the j-shaped wall and a wall of the collection device.

8. The collection device of claim **1**, wherein the collection device includes a front wall, a rear wall, a bottom wall and a dividing wall extending from the bottom wall between the front wall and rear wall to define the first compartment and second compartment.

9. The collection device of claim **8**, wherein the shield comprises a suspended wall extending between the front wall and the rear wall.

10. The collection device of claim **9**, wherein the filter comprises a space between the suspended wall and dividing wall that allows fluid to flow into the first compartment while preventing aquatic life from flowing into the second compartment from the first compartment.

11. A collection device for aquatic life and debris trapped by a water screen, comprising:

- a first side wall;
- a second side wall;
- a bottom wall extending between the first side wall and the second side wall;
- a divider extending into a space between the first side wall and the second side wall to define a first compartment and a second compartment; and
- a filter in the divider for allowing the passage of fluid through the divider while preventing the flow of aquatic life through the divider.

12. The collection device of claim **11**, wherein the divider includes an upper portion that is substantially impervious to fluid flow and a lower portion comprising the filter.

13. The collection device of claim **11**, wherein the first compartment and the second compartment are troughs.

14. The collection device of claim **11**, wherein the filter comprises one of: mesh, a valve, profile bar, a gate, a pipe and perforations in the divider.

15. The collection device of claim **11**, wherein the divider comprises a j-shaped wall extending between the first side wall and the second side wall.

16. The collection device of claim **11**, wherein the divider blocks high pressure spray directed into the second compartment from entering the first compartment.

17. The collection device of claim **11**, further comprising a shield for blocking high pressure spray directed into the second compartment from entering the first compartment.

18. A collection device for aquatic life and debris trapped by a water screen, comprising:

- a first compartment for receiving aquatic life trapped by the water screen;
- a second compartment adjacent to the first compartment for receiving debris trapped by the water screen; and
- a divider separating the first compartment from the second compartment, the divider comprising a wall including a

plurality of openings for placing the first compartment in fluid communication with the second compartment.

19. The collection device of claim **18**, wherein the openings are formed in a mesh that allows the flow of fluid from the second compartment into the first compartment and blocks the passage of aquatic life from the first compartment into the second compartment.

20. A water screen system, comprising:

a traveling water screen including lift elements;

a high pressure nozzle for applying a high pressure fluid spray to the water screen to release debris from the water screen; and

a collection device for collecting aquatic life and debris collected by the water screen, the collection device comprising a first compartment for collecting aquatic life from the lift elements, a second compartment for collecting debris from the water screen released by the high pressure fluid spray, and a filter for allowing fluid flow from the second compartment to the first compartment while preventing aquatic life from entering the second compartment from the first compartment.

21. The water screen system of claim **20**, wherein the high pressure nozzle is located within the water screen and the collection device is located outside the water screen.

22. The water screen system of claim **20**, wherein the collection device is located within the water screen.

* * * * *



US005422000A

United States Patent [19]

[11] Patent Number: **5,422,000**

Huber

[45] Date of Patent: **Jun. 6, 1995**

[54] **DEVICE FOR CLEANING LARGE QUANTITIES OF WATER FROM RAKINGS**

5,013,430 5/1991 Mileson .

5,078,865 1/1992 Huber .

5,110,461 5/1992 Abel .

5,232,587 8/1993 Hegemier .

[76] Inventor: **Hans G. Huber**, Zum Rachental 8, D-92334 Berching, Germany

FOREIGN PATENT DOCUMENTS

[21] Appl. No.: **145,394**

265385 4/1988 European Pat. Off. .

[22] Filed: **Oct. 29, 1993**

212048 5/1908 Germany .

[30] **Foreign Application Priority Data**

2142540 3/1973 Germany .

Nov. 3, 1992 [DE] Germany 42 37 123.6

8707094 10/1987 Germany .

4037884 6/1992 Germany .

9205674 9/1992 Germany .

[51] **Int. Cl.⁶** **B01D 35/02; B01D 35/027; B01D 29/64**

2-013622 1/1990 Japan .

3-262506 11/1991 Japan .

[52] **U.S. Cl.** **210/162; 210/357; 210/358; 210/413; 210/415; 210/474; 210/497.01**

4-174145 6/1992 Japan .

190659 5/1937 Switzerland .

6172 of 1913 United Kingdom .

1525871 9/1978 United Kingdom .

[58] **Field of Search** 210/154, 162, 357, 358, 210/413, 414, 415, 497.01, 498, 474, 475

1605964 11/1990 U.S.S.R. .

1663135 7/1991 U.S.S.R. .

9208539 5/1992 WIPO .

[56] **References Cited**

U.S. PATENT DOCUMENTS

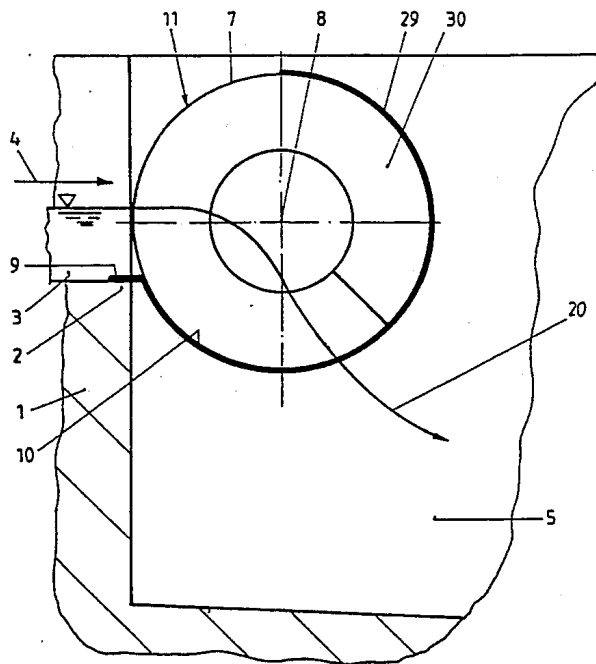
- 184,815 11/1876 Adamson .
- 493,403 3/1893 Holmes .
- 546,708 9/1895 Pierce .
- 1,143,496 6/1915 Briles .
- 2,776,755 1/1957 Craig .
- 2,830,695 4/1958 Fennimore .
- 2,910,181 10/1959 Schade .
- 2,929,504 3/1960 Lind .
- 3,255,074 6/1966 Salomon .
- 4,153,557 5/1979 Hori .
- 4,415,462 11/1983 Finch .
- 4,424,129 1/1984 Burger .
- 4,601,819 7/1986 Pellhammer .
- 4,713,179 12/1987 Goedderz .
- 4,859,322 8/1989 Huber .
- 5,006,236 4/1991 Croket .

Primary Examiner—Thomas M. Lithgow
Attorney, Agent, or Firm—Hopkins & Thomas

[57] ABSTRACT

A device for cleaning large quantities of water (3) of rakings at overflow edges (2), especially from rain water reservoirs, rivers, etc., with a stationary separation area (10), which is formed as a section of a cylinder jacket (7) with an axis (8) parallel to the overflow edge, through which the quantity of water flows is provided. A takeover device (11), which is driven about an axis (8) of the cylinder jacket (7), is assigned to the separation area (10) for removing the rakings separated at the separation area (10).

6 Claims, 3 Drawing Sheets



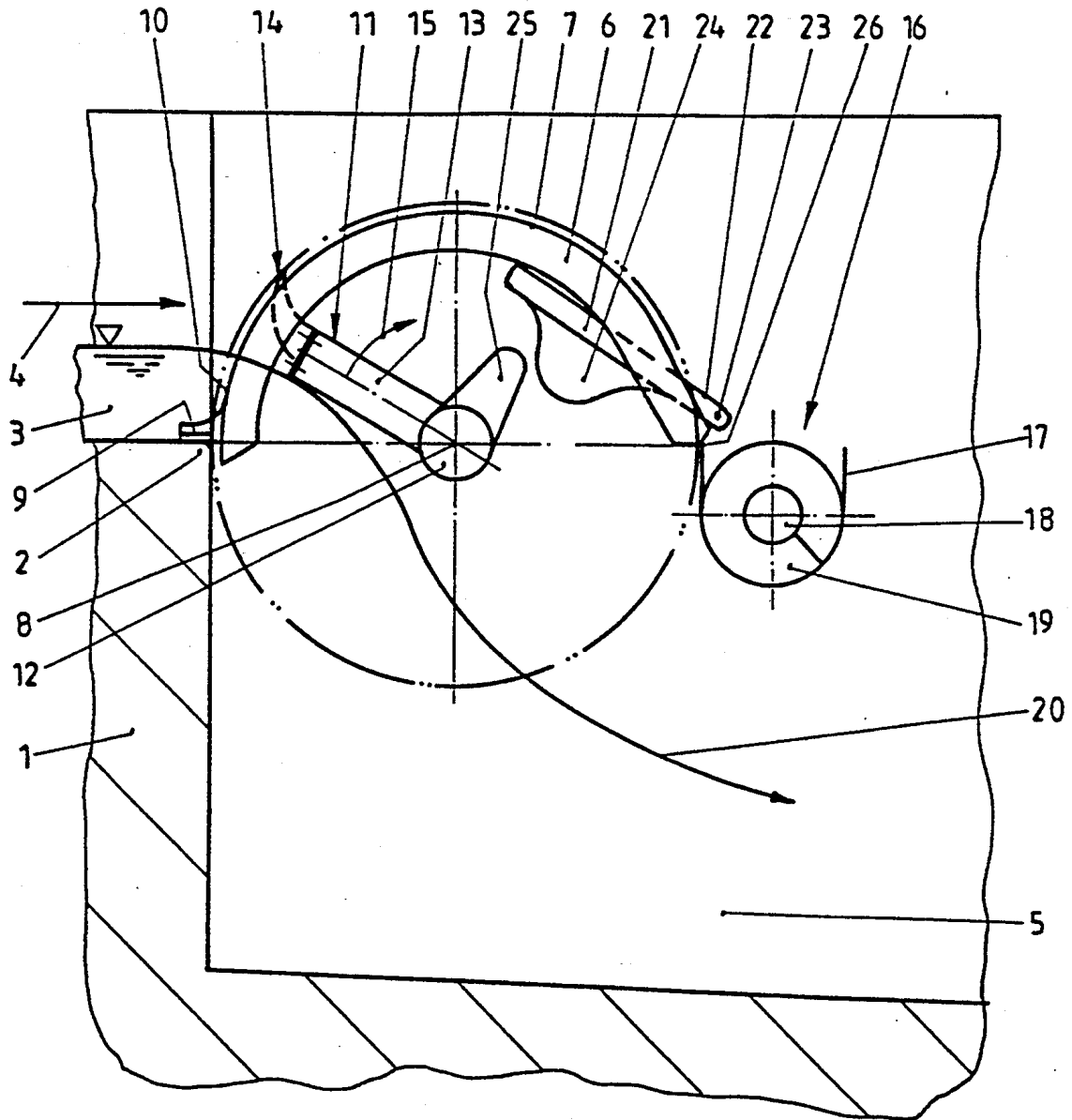


Fig. 1

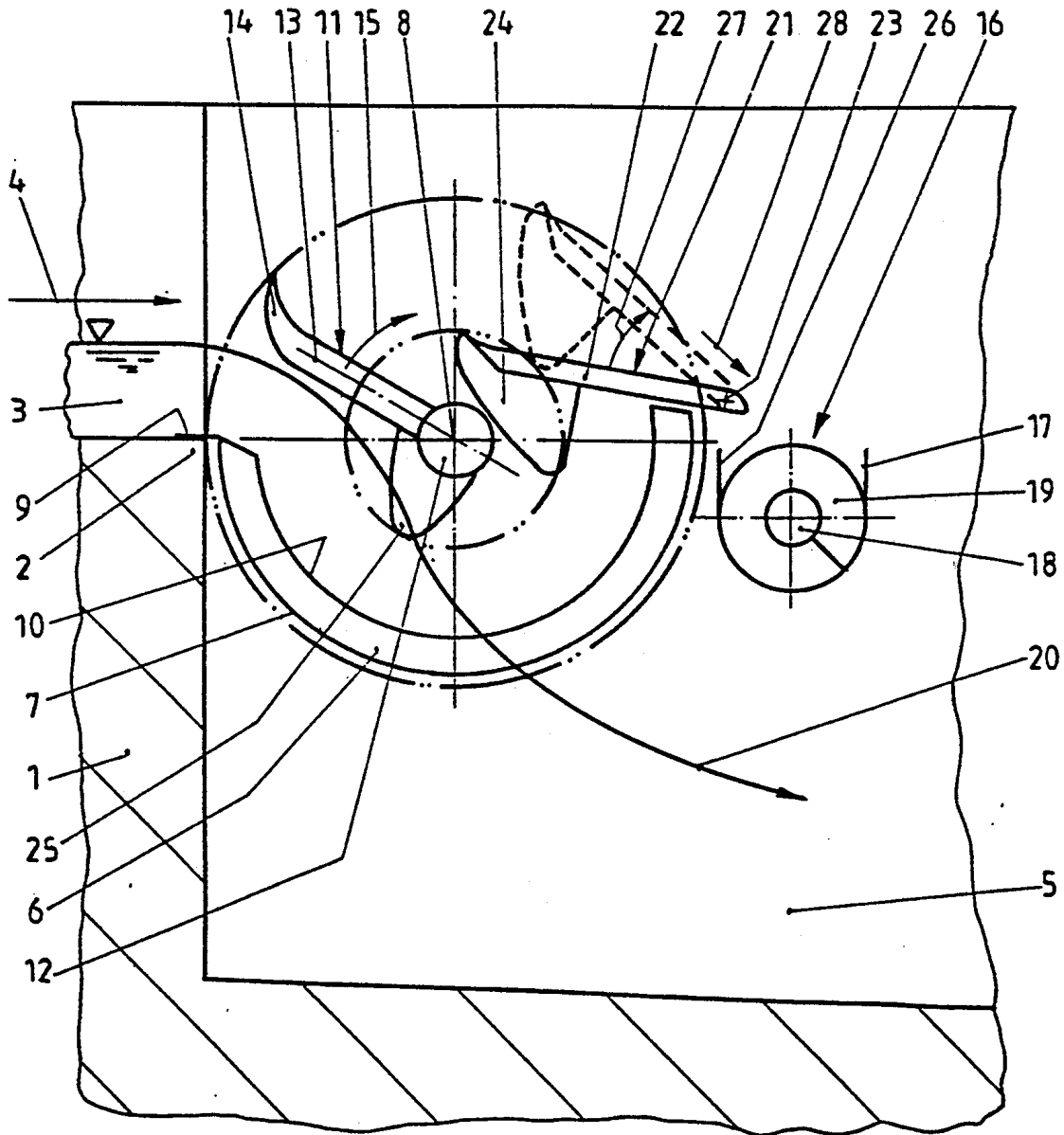


Fig. 2

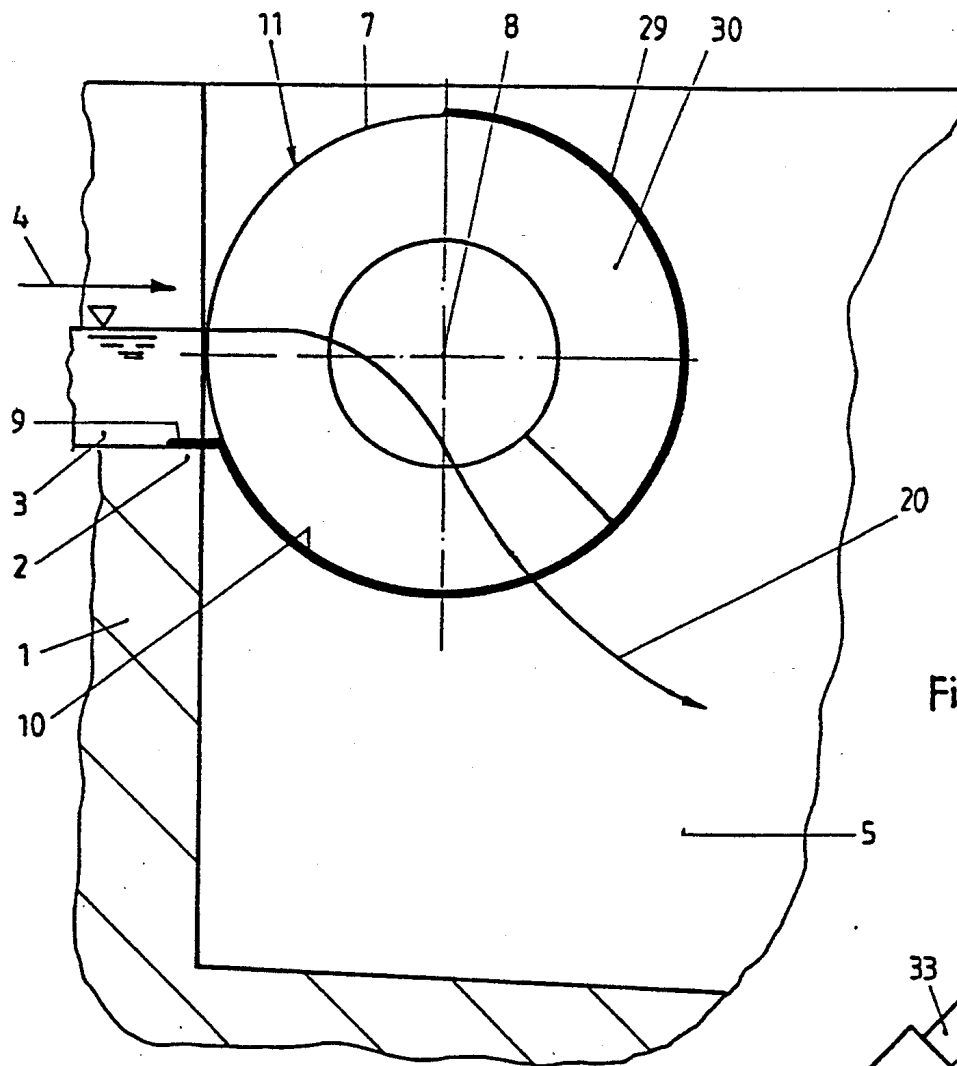


Fig. 3

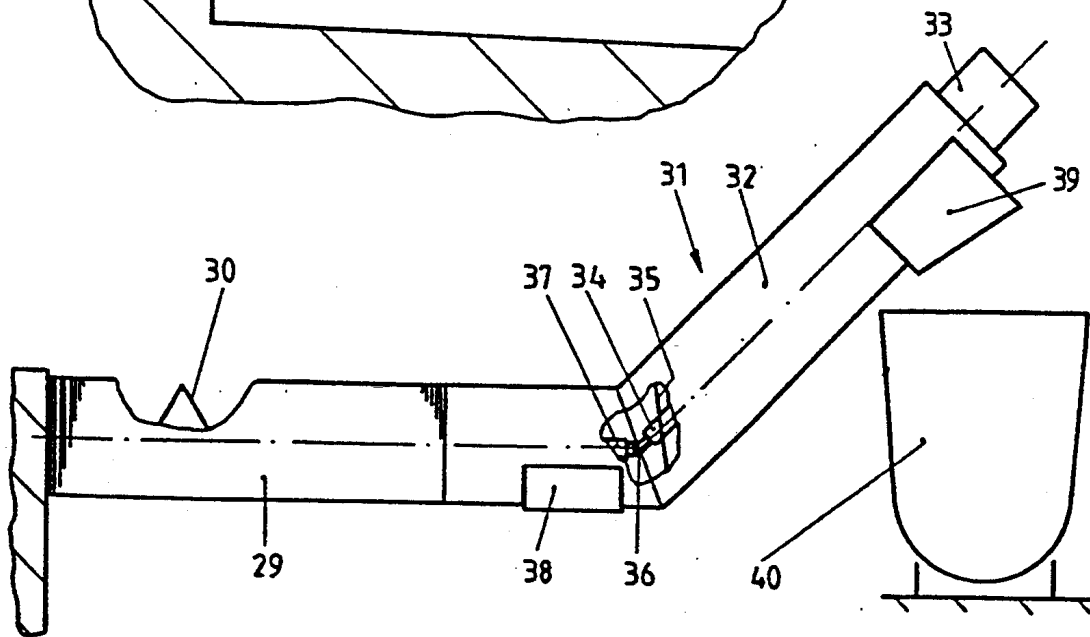


Fig. 4

DEVICE FOR CLEANING LARGE QUANTITIES OF WATER FROM RAKINGS

BACKGROUND OF THE INVENTION

The invention is related to a device for cleaning large quantities of water and rakings at overflow edges. In different applications the necessity arises to sieve and clear rakings of large quantities of water. When, for instance, a large quantity of cooling water is to be taken from a river, an overflow edge is usually created, and the overflowing water is used. This should, depending on the requirements, be free of matter ranging from rakings to suspended particles. Local sewage technique also has the problem to sieve large quantities of water, especially during and after the event of a heavy rain, e.g. a thunderstorm. Then a large quantity of water is accumulated in a relatively short time, which the sewage plant is not designed to cope with. Rain reservoirs and rain overflow basins are then used, to store the surplus quantity of water intermediately and to work it off after the end of the rain event. But such rain reservoirs also have a limited capacity, which in some cases will be exceeded, so that the surplus water will then be routed e.g. into a river untreated. Especially during such thunderstorms or after dry weather periods the water carries a lot of dirt that should be separated off.

A device of the above described type is known from the German Offenlegungsschrift 40 37 884. The separation area is formed to be a section of a cylinder jacket and arranged with its axis lying parallel to the overflow edge. The separation area extends over about 90° of tile cylinder jacket, and the axis of the cylinder jacket is provided a distance corresponding to about the radius of the cylinder jacket below the overflow edge, so that the water flowing over the overflow edge is supplied at about the highest point of the cylinder jacket. The separation area is thereby limited in area, and there is the danger that after a blocking of the separation area the water will flow over the device into a drainage channel untreated. A takeover device, which is driven about the axis of the cylinder jacket, is assigned to the separation area for removing the rakings separated at the separation area. The takeover device is driven by the overflowing water itself, so that the drive is dependant on the water level above the overflow edge. At a low water level there is the danger that the takeover device is not driven anymore. At a high water level there is the danger that the separation area, which is limited in area, is blocked quickly and that the following water flows over it untreated.

SUMMARY OF THE INVENTION

It is the object of the invention to provide a device of the type described above, with which large quantities of water can be cleaned reliably, without the danger of the separation area being blocked.

According to the invention this is achieved when the separation area with its axis is arranged at about the height of the overflow edge and extends arching to the top or bottom over about 180° of the lying cylinder jacket, so that there is a forced flow through the separation area, and that a transverse conveyor for transporting the separated rakings to the side is provided.

This device provides an effectively enlarged separation area. The axis of the cylinder jacket of the separation area in the form of a cylinder jacket is arranged at the same height as the overflow edge, so that there is

the possibility to make use of the enlarged separation area. There is a forced flow, i.e. the incoming liquid must pass through the separation area. Should the driven takeover device fail the water level will rise and a further section of the separation area, which is not blocked, is provided. At most the water level will rise here. Insofar there is the possibility to use an intermitting drive for the takeover device and to control this in dependence of the water level. It is also possible, though, to operate the takeover device continually or at regular intervals with a time control. By this a continually self cleaning device is created, which has a great operating reliability. The device allows for the separation and removal of the rakings from the large quantity of water, so that these rakings, e.g. leaves, branches, drink cans etc., must not be separated once more.

A transverse conveyor for transporting the separated rakings to the side is provided, so that the direction of flow of the water does not have to be changed. The transverse conveyor has the object to take over the rakings from the takeover device and to laterally transport them away. As a transverse conveyor a screw conveyor device with a housing, a conveyor helix, and a drive may be provided. The axis of the screw conveyor device again extends parallel to the axis of the cylinder section of the separation device as well as parallel to the overflow edge. The rakings are transported away by the transverse conveyor and can be deposited in e.g. a container.

The separation area may be comprised of a number of grating bars arranged parallel to each other. A comb-like rake penetrating the grating bars may be provided as the takeover device. The separation area thereby is formed at a grating of grating bars, where the grating bars; are arranged along perimeter lines of the cylinder and extend over part of the perimeter. Between neighboring grating bars there is a distance through which the comb-like rake penetrates, so that the rakings are removed from the separation area and transported away from the region of the water flowing through by the comb-like rake. At the same time the separation area is cleaned at each pass of the comb-like rake. The distance between the grating bars is decisive for the degree of separation. With relatively large quantities of water the rakings are separated in the sense of a rough cleaning of the water.

It is also possible that the separation area consists of a screen and that the takeover device is provided as a conveyor helix. The conveyor helix then brushes along the screen with its perimeter and carries the separated rakings along. The formation of a separation area at a screen allows for a finer sieving, that is to remove relatively smaller rakings from the water. The geometry of the holes or slits in the screen is decisive for the separated rakings.

In this embodiment the conveyor helix in conjunction with the screen forms the transverse conveyor.

When the separation area is formed at a grating as a section of a cylinder jacket, the separation area may be provided on the outside or inside of the grating bars. When the separation takes place on the outside, the grating bars extend from the overflow edge arching upwards and then again downwards. When the separation area is formed on the inside, the grating bars extend arching downwards from the overflow edge and then rise again, forming a trough for the separated rakings.

A passing-on device, which is formed in a comb-like fashion and penetrates the grating bars, may be assigned to the separation area and the takeover device. This passing-on device has the object to take over the rakings from the takeover device and to route them into the following transverse conveyor. The passing-on device itself is arranged movable, in order to conduct the temporarily stored rakings into the transverse conveyor and thereby be cleaned itself, to be able to conduct more rakings at the next pass of the takeover device.

The passing-on device is suitably supported swivelling outside the perimeter of the takeover device and has a stop for a cam arranged on the shaft of the takeover device. This has the advantage that the passing-on device is moved and cleaned at regular intervals by the drive of the takeover device.

The passing-on device is supported above the transverse conveyor and reaches with its comb-like teeth into the perimeter of the takeover device.

When the takeover device is formed to be a screw conveyor device, with a housing functioning as a screen, then this device forms the transverse conveyor at the same time. The conveyor helix may then merge into an upwards directed conveyor, for instance to enable or make easier the dropping of the rakings into a container.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be further explained and described by means of preferred embodiments. The drawings show:

FIG. 1 a vertical cut through the major parts of the device in a first embodiment,

FIG. 2 a similar representation of a second embodiment,

FIG. 3 a vertical cut through a device in a third embodiment, and

FIG. 4 a side view of the device as shown in FIG. 3.

DETAILED DESCRIPTION

In the area of a vertical wall 1 an overflow edge 2 is formed, over which the large quantity of water 3 to be sieved flows in the direction of the arrow 4. The quantity of water 3 stems from a reservoir, a river or such. Connecting to the overflow edge 2 with respect to wall 1 is an overflow basin 5, into which only cleaned water passes, which can be removed therefrom or conducted elsewhere.

The new device is shown with its major parts relative to the overflow edge 2. There are arched grating bars 6 arranged at a distance next to each other, which extend over about 180° of a lying cylinder jacket 7, whose axis 8 is arranged parallel to and at the height of the overflow edge 2. The grating bars 6 have continuations 9 directed at the overflow edge 2, with which they are supported on the overflow edge 2. The fastening of the device at the place of deployment is not shown further.

The grating bars 6, whose number and distance in between, in the direction of the axis 8, can be chosen constructively, form on their outer side the separation area 10, which starts at the overflow edge 2 and extends arched upwards. It can be seen that the separation area 10 can expand with the quantity of water above the overflow edge 2. By this the separation area 10 adapts itself to the quantity of water, so that it is available for different quantities of water. The grating bars 6 are immovable.

A takeover device 11, which has a shaft 12 and radially extending arms 13, is assigned to the grating bars 6 and the separation area 10 formed thereof. Fingers 14, whose geometry and arrangement are matched to the arrangement of the grating bars 6, are connected to the arms 13. The fingers 14 reach through the gaps between the grating bars 6 and extend beyond the outer circumference of the cylinder jacket 7 with respect to the separation area 10 by a certain amount. The shaft 12 of takeover device 11 is circularly driven by a motor not depicted, e.g. an electric motor, in the direction of the arrow 15 continually or at regular intervals, whereby the fingers 14 of the takeover device enter into gaps between the grating bars 6 in the area of the overflow edge 2 and transport the rakings separated at the separation area 10 upwards. The rakings come out of the area of the quantity of water 3 and fall over the downwardly arched part of the grating bars 6 into the transverse conveyor 16, which may have a housing 17 open at the top, a driven shaft 18 and a conveyor helix 19. It goes without saying that the shaft 18 is driven turning by a drive not depicted, so that the dropped rakings are moved away sideways. With the exception of the separation area 10, through which the water flows, the separated rakings are above an indicated drop-over line 20 and thereby outside of the water. It can be seen that the capacity of the overflow basin 5 is limited by the height of the overflow edge 2, so that the cleaned water has to be removed from this basin or conducted elsewhere. For storage the overflow basin 5 has to be formed large enough.

In order to make the transport of the rakings from the takeover device 11 to the transverse conveyor 16 easier or better, the device may have a passing-on device 21. The passing-on device has as major parts a comb-like rake 22, the fingers or rods of which also extend through the gaps between the grating bars 6. The fingers or rods are supported swivelling about a horizontal axis 23 in a limited way and extend from the outside into the inside of the cylinder jacket 7, by which the grating bars 6 are interspersed. In FIG. 1 one extreme position of the passing-on device 21 is shown, which is secured for instance by a stop not shown. Some or all of the fingers or rods of the passing-on device 21 have on their lower side on the inner side of the device a stop 24, whose downwards turned surface works together with a cam 25 that is mounted in a non-rotating way on the shaft 12. When the shaft 12 and therefore also the cam 25 turn the passing-on device 21 is lifted into a steeper position, so that rakings deposited on the outer free surface of the rake 22 slide down on the now steeper passing-on device and fall into the transverse conveyor 16. At the same time the passing-on device 21 serves to transport the rakings over the upper edge 26 of the housing 17 of the transverse conveyor 16. So one advantage of the passing-on device 21 is that the transverse conveyor 16 can be arranged relatively high. When the transverse conveyor 16 is arranged in the lower part relatively to the cylinder jacket 7, the passing-on device 21 is not needed in most cases. Otherwise the object of the passing-on device 21 is to make sure that no separated rakings get into the cleaned water of the overflow basin 5.

FIG. 2 shows a further embodiment of the device, which in principal is built similarly as the device of FIG. 1, so that reference can be made to the description regarding that. Deviating from the embodiment of FIG. 1 the grating bars 6 are in this case arranged not in the

upper section of the cylinder jacket 7 but in the lower section in a immovable fashion, so that the separation area 10 is formed on the inside of the grating bars 6. The takeover device 11 may be formed identically as in the embodiment of FIG. 1. The fingers 14 may be formed 5 arched in the direction shown. A radially straight extension of the fingers 14 is also possible. It can be seen here that the fingers 14 extend relatively further through the separation area 10 in a radial direction, so that a corresponding amount of rakings can be transported upwards 10 by the fingers 14, when the fingers 14 protrude over the area of the grating bars 6 and the drop-over line 20 of the quantity of water 3.

The passing-on device 21 is depicted in its initial position by a solid line and in its swung up position by 15 the broken line. The broken line position is attained by swinging over the cam 25 and the stop 24 in the direction of the arrow 27. The rakings then slide in the direction of the arrow 28 into the transverse conveyor 16. Of course a conveyor belt could be provided instead of the 20 transverse conveyor 16.

The embodiment of FIG. 3 is a structural unification of the separation area 10, the takeover device 11 and the transverse conveyor 16. The separation area 10 is formed to be the inner surface of a screen 29, which also 25 extends over a part of the perimeter of a cylinder jacket 7. The screen 29 is fashioned to be open towards the quantity of water 3 and connects with a continuation 9 to the overflow edge 2. The screen 29 has breakings, e.g. holes or slits, whose geometry and arrangement is 30 adjusted to the size of the rakings to be separated. The takeover device 11 in form of a conveyor helix 30, which is supported preferably shaftless in the housing- 35 like screen 29 and driven accordingly, is assigned to the separation area 10. The outer edge of the conveyor helix 30 brushes again and again along the screen 29 and especially along the separation area 10, so that the rakings are taken and moved sideways in the direction of 40 the axis 8.

It can be seen from FIG. 4 that the device can be 40 continued in an upwards directed conveyor line 31, in the housing 32 of which a motor 33 driving a shaft 34 with a conveyor helix 35 is provided. The shaft 34 may be connected to a cardan joint 36 and a shaft stub 37, 45 which carries and drives the conveyor helix, which for most of its length is shaftless. A lid 38 may be provided, so that the rakings can be removed and carried away at this position. Usually, though, the rakings are transported up the conveyor line 31 and dropped through a 50 discharge chute 39 into a container 40.

While the foregoing specification and drawings describe a preferred embodiment of the invention, it will be understood by those skilled in the art that variations and modifications of the disclosed embodiment may be 55 made without departing from the spirit and scope of the invention as described by the following claim.

LIST OF REFERENCE NUMERALS

- 1—wall
- 2—overflow edge
- 3—quantity of water
- 4—arrow
- 5—overflow basin
- 6—grating bar
- 7—cylinder jacket
- 8—axis
- 9—continuation
- 10—separation area

- 11—takeover device
- 12—shaft
- 13—arm
- 14—finger
- 15 15—arrow
- 16—transverse conveyor
- 17—housing
- 18—shaft
- 19—conveyor helix
- 10 20—drop-over line
- 21—passing-on device
- 22—rake
- 23—axis
- 24—stop
- 15 25—cam
- 26—edge
- 27—arrow
- 28—arrow
- 29—screen
- 20 30—conveyor helix
- 31—conveyor line
- 32—housing
- 33—motor
- 34—shaft
- 25 35—conveyor helix
- 36—cardan joint
- 37—shaft stub
- 38—lid
- 39—discharge chute
- 30 40—container

I claim:

1. A device for collecting and removing material and debris from a liquid flow passing into an overflow basin, the basin having a generally horizontal bottom wall and at least one generally vertical wall extending upward therefrom to form the basin, comprising:

an elongated substantially horizontal overflow edge over which the fluid flow passes downwardly into the basin, said overflow edge being formed at the top of the generally vertical wall forming the basin; an elongated filter screen, said filter screen being supported overflow edge, the filter screen having an elongated axis extending parallel to the overflow edge, wherein said axis is positioned at the same height as the overflow edge above the basin; said filter screen being formed as a screen for a cylinder having an elongated side opening extending the length of the filter screen along the overflow edge for receiving the liquid flow passed over said overflow edge, wherein said filter screen extends through an arc of no less than one-hundred (180) degrees;

a separation area formed on that portion of said filter screen through which the liquid flow passes downwardly into the basin for collecting material and debris from the liquid flow passed therethrough; and

takeover device means for removing the material and debris collected on said separation area from said filter screen.

2. The device of claim 1 wherein said takeover device means comprises:

a screw conveyor, wherein said screw conveyor has a conveyor helix with a shaft extending along the axis of said filter screen:

65 means for rotating said conveyor helix about said shaft: wherein said conveyor helix rotates about said shaft and brushes along the separation area and the filter

screen to remove material and debris collected thereon from said filter screen.

3. The device of claim 2 wherein said conveyor helix moves the material and debris collected on said filter screen transverse to the direction of the liquid flow passing over the overflow edge.

4. The device of claim 2 further comprising a conveyor line, wherein said conveyor line is connected to said screw conveyor and transports the collected material and debris from said screw conveyor upward toward a discharge chute.

5. The device of claim 1, wherein said filter screen comprises a plurality of spaced apart grating bars.

6. A device for collecting and removing rakings from a flow of water (3), from a rainwater reservoirs the flow of water passing downward into a basin (5), comprising: a generally horizontal overflow edge (2) over which the flow of water passes into the basin said overflow edge being formed at the top of a generally vertical wall forming the basin; an elongated concave filter screen (29), said filter

screen being supported on the overflow edge, the filter screen having a longitudinal axis (8) oriented parallel to and at the same height as the overflow edge above the basin, said filter screen formed as a section for a cylinder extending in an arc of more than one hundred-eighty (180) degrees about said longitudinal axis and defining an elongated opening extending the length of the cylinder along the overflow edge for receiving the flow of water and the rakings in said concave filter screen and collecting the rakings thereon;

elongated helical conveyor means (30) rotatably mounted in and extending along the length of said concave filter screen; and

drive means (33) for rotating said helical conveyor means approximately about the longitudinal axis of said concave filter screen for urging the rakings collected on the concave filter screen away from the flow of water entering the concave filter screen.

* * * * *

25

30

35

40

45

50

55

60

65