

Diego Gonzalez

1) Family number: 30633100 (US2006163173A)

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Title: METHOD FOR TREATING SEWAGE AND SEWAGE TREATMENT SYSTEM IN COMBINED SEWER SYSTEMS

Abstract: The present invention has an object of providing a sewage treatment method and a sewage treatment system in a combined sewer system which can safely treat sewage, and in a combined sewer system where wastewater and rainwater collected flow together as the sewage in a single pipe, the sewage is electrochemically treated, i.e., electrolytically treated by use of electrodes for electrolysis to produce hypohalogenous acid, ozone or activated oxygen in the sewage. The thus produced hypohalogenous acid, ozone or activated oxygen can treat contaminants such as organic substances and coliforms present in the sewage.

Classifications:

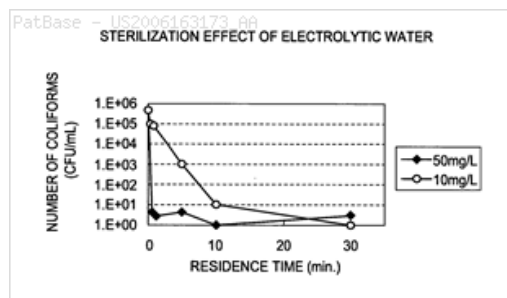
International (IPC 8-9): C02F1/46 C02F1/50 C02F1/72 C02F1/76 C02F1/78 (Advanced/Invention); C02F1/66 (Advanced/Non-invention); C02F1/46 C02F1/50 C02F1/72 C02F1/76 C02F1/78 (Core/Invention); C02F1/66 (Core/Non-invention)

International (IPC 1-7): C02F1/46 C02F1/50 C02F1/72 C02F1/76 C02F1/78

CPC: C02F1/4672 C02F1/4674 C02F1/66 C02F2001/46138 C02F2103/001 C02F2103/08 C02F2201/46125 C02F2209/44 C02F2305/023

European: C02F1/467B M02F1/461B2J2 M02F1/467B2 M02F1/66 M02F103/00B M02F103/08 M02F201/461B6B M02F209/44 M02F305/02B

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Family:

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JP2004122098 A2	20040422	JP20020357879	20021210
US2006163173 AA	20060727	US20030629843	20030730

Priority:

JP20020228905 20020806 JP20020357879 20021210

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Agent(s): MCDERMOTT WILL AND EMERY LLP

2) Family number: 32397 (US3399133A)

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Title: METHOD FOR DEVELOPING A CONTROL SIGNAL AND FLOCCULATING PROCESS EMPLOYING SAME

Abstract: ABSTRACT OF THE DISCLOSURE

Processes are provided for developing a control signal related to the surface charge condition of solids in aqueous dispersion by flowing the aqueous dispersion over a dielectric surface and detecting through electrodes spaced apart at points along the flow path in direction of flow the rate of charge transport. The signal thus de-veloped is used in flocculation processes to control the amount of charge influencing chemical added to the aqueous dispersion. One mode of operation involving alternately flowing the dispersion and a second aqueous medium over the dielectric surface yields a signal of sig-nificantly increased amplitude. Either voltage or current incidents of the charge transport may be measured. Meas-uring current has the advantage of being less sensitive to conductance of the aqueous dispersion. Preferably the conductance is less than that of an aqueous solution con-taining 100 parts per million of sodium chloride.

Classifications:

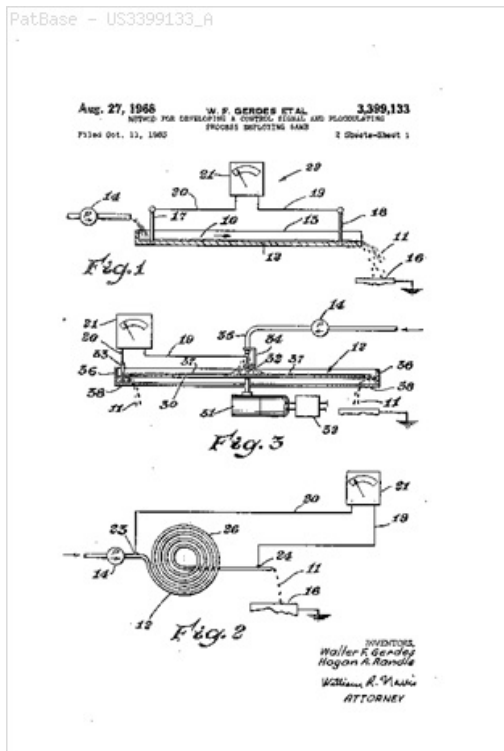
International (IPC 8-9): B01D21/01 C02F1/52 C02F1/68 G01N15/06 G01N27/00 G01N27/60 G01R27/26 G05D11/13 (Advanced/Invention); G01N15/00 (Advanced/Non-invention); C02F1/52 C02F1/68 G01N15/06 G01N27/60 G05D11/00 (Core/Invention); G01N15/00 (Core/Non-invention)

International (IPC 1-7): B01D21/01 B05D1/14 G01N27/00 G01N27/22 G01N27/60 G01N33/18

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European: C02F1/52 C02F1/52A C02F1/68P G01N15/06D G01N27/60 G05D11/13 S01N15/00V

US: 137/2 210/143 210/198.1 210/42 210/709 210/87 210/921 210/96.2 324/453 324/71.1 73/61.41 73/861.08

**Family:**

Publication number	Publication date	Application number	Application date
AU4931764 A1	19680317	AU19640049317	19640915
BE654228 A	19650409		19641009
CH472031 A	19690430	CH19640013137	19641009
DE1498696 A1	19691113	DE19641498696	19641008
FR1414139 A	19651015	FR19640990793	19641008
GB1064979 A	19670412	GB19640039864	19640930
NL6411566 A	19650412	NL19640011566	19641005
SE321104 B	19700223	SE19640012162	19641009
US3399133 A	19680827	US19630315562	19631011

Priority:

US19630315562 19631011 FR19640990793 19641008

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Title: APPARATUS FOR PURIFYING CHROMIUM BEARING EFFLUENTS

Abstract: Source: SU912664T **Machine translation:** Invention relates to wastewater treatment, in particular to a chromium-containing waste water purification. known plant for the purification of chromium-containing waste water, comprising serially connected elektrokoagul torus skimmer and a filter diaphragm electrolytic cell, the cathode chamber is connected to the skimmer. In the known apparatus a diaphragm electrolytic cell is located downstream of the filter and its cathode connected to the skimmer chamber IIj. disadvantage of the known installation is a low degree of water from hexavalent chromium. object of the invention - increasing the degree of purification of water from hexavalent chromium. The goal is achieved in that according to the apparatus for purifying wastewater chromium containing serially connected elektrokoagul torus skimmer and a filter diaphragm electrolytic cell, the cathode chamber is connected to the skimmer, a diaphragm electrolytic cell is installed in front elektrokoagul torus chamber and the anode is connected to the electrolyser elektrokoagul torus. The drawing shows a diagram of the installation. installation includes raw water pipe 1 equipped ventito L E 2 for regulating the flow rate of water supplied to the anode 3 and the cathode chamber k diaphragm electrolyzer 5. to anode electrolytic cell 3 are connected in series 15 torr connected elektrokoagul 6 skimmer 7 and filter 8. k electrolyzer cathode compartment 5 is connected to the skimmer 7 via conduit 9. The device operates as follows ob20 time. The feed water hromsoderzhascha 1 through conduit 3 is supplied to the anode and cathode chambers diafragiennogo k electrolyzer 5. distribution stroke adjustment of the water supplied into the electrode chamber is performed by means of; valve 2. In the cathode chamber k electrochemically water made alkaline to pH 11,2-11,6. Simultaneously, water in the anode chamber is adjusted to pH podki.sl 2,83,2, whereupon the acid anolyte is directed in elektrokoagul 6 Torr. Elektrokoagul torus occurs in the restoration of chromium (VI) to chromium (III) ions, the iron (II), when obrazuyuschimis ionization iron anodes. Passivation elektrokoagul iron anodes in a torus becomes difficult because it is treated water having an acidic reaction. This ensures complete recovery of chromium (VI). After elektrokoagul torus anolyte is directed into the skimmer 7 "which comes on line 9 alkaline catholyte withdrawn from kamery.Ts. As a result of the mixing of anolyte and catholyte that comes recovery of chromium (VI), present in the catholyte, as well as increasing the pH of the water to form a sparingly soluble hydroxides of chromium and iron. Separation of the solid and liquid phases is effected in the skimmer 7 and filter 8. EXAMPLE. Carried water purification hromsoderzhaschih.stochnyh galvanizing plant on the known and proposed installations. The processing parameters: flow rate 86 l / h, the current density at the electrodes, and electrolytic elektrsUkoagul torus A / dm, the flow of electricity in the torus elektrokoagul 1420 Cl 1 mg of chromium (VI), electricity consumption by acidification of anolyte in electrolytic diaphragm cells / liter voltage elektrokoagul torus at 12B in the electrolyzer 18, the flotation time of 30 min, the filtration rate of 2 m / h, the flow ratio of the anolyte and catholyte 0,22:0,78. The material diaphragm

Classifications:
International (IPC 8-9): C02F1/46 C02F1/463 (Advanced/Invention);
 C02F101/22 (Advanced/Non-invention);
 C02F1/46 C02F1/463 (Core/Invention)
International (IPC 1-7): C02F1/46 C02F1/463



Publication number	Publication date	Application number	Application date
■ SU912664 A1	19820315	SU19802866641	19800107
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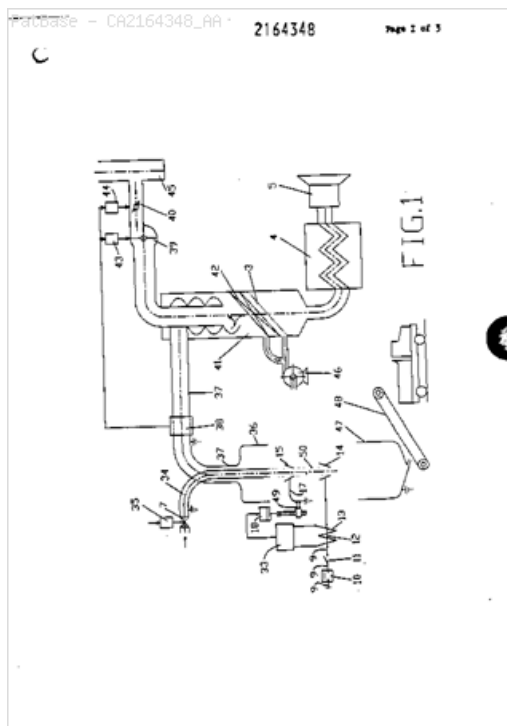
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4) Family number: 9535510 (CA2164348A)

Title: METHOD AND APPARATUS FOR TREATMENT OF INDUSTRIAL AND MUNICIPAL LIQUID WASTES

Classifications:
International (IPC 8-9): C02F1/46 (Advanced/Invention);
 C02F1/46 (Core/Invention)
International (IPC 1-7): C02F1/46
IPC: B01D53/229 C02F1/4608 C02F2001/46123 C02F2101/006
 C02F2101/30 C02F2201/4612 C02F2303/04
European: B01D53/22W C02F1/463 M02F1/461B2F M02F101/00R
 M02F101/30 M02F201/461B6 M02F303/04



Family:

Publication number	Publication date	Application number	Application date
CA2164348 AA	19970605	CA19952164348	19951204
CA2164348 C	19980421	CA19952164348	19951204

Priority:

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5) Family number: 44314767 (BRPI0701839A)

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Title: PROCESSO ELETROGRAVIMETRICO DIRETO E INDIRETO AUTOMATIZADO DIRECT AND INDIRECT PROCESS ELETROGRAVIMETRICO AUTOMATED (Machine translation)

Abstract: Source: BRPI0701839A [PT] pf OID- percent 1/13 RESUMO PROCESSO ELETROGRAVIMETRICO DIRETO E INDIRETO AUTOMATIZADO pertence ao campo da industria de mineracao, eletroquimica, eletrotermica e termoquimica industrial, mais particularmente a um processo eletroquimico de eletrogravimetria e termoeletrogravimetria aplicado a producao de metais de alta qualidade a partir da industria mineral sendo um novo metodo de processo de tratamento de terra mineral, concentrada, exemplarmente o minerio de sulfeto CuFeS₂, Calcopirita, sulfeto de cobre e ferro, executados nas maquinas de celulas como ilustra as figs. 2, 3, 5, 8, 9, 12 a 19 e 117, de execucao do processo direto e as maquinas das figuras, 21, 22, 50, 48 de execucao do processo indireto compreendidos de modo geral nos fluxogramas das figuras 28 e 29 e fluxogramas operacionais das fig. 37 a 43, podendo ser melhor compreendido com uma vista panoramica de cima visualizando a fig. 32 que ilustra a montagem da plataforma em funcionamento resultando na extracao gravimetrica dos metais constituintes na terra mineral separando de sua conjugacao eletrônica com os ametais como os de enxofre, arsenio, telurio, e com os nao metais de interesse da tabela periodica executado pelo processo eletrogravimetrico direto e indireto. Esta invencao de processo de como se extrair os metais e o seu hidroxido metalico correspondente, diretamente via eletroquimica de eletrogravimetria em Celula Eletrogravimetrica Mineral fig. 2, 3, e indiretamente via fundicao instantanea da terra mineral em Forno Termoeletrogravimetrico fig. 21, 48, 50 resultando em liga complexa que depois e decomposta por eletrogravimetria seus constituintes sao separados por este processo partindo deste minerio primario de origem, juntamente com o conjunto de maquinas inventivas representadas nas figuras de 1 a 120 anexo, das quais se executa o presente PROCESSO ELETROGRAVIMETRICO DIRETO E INDIRETO sendo que estas maquinas de Celulas Eletroquimicas de Eletrogravimetria e o Forno Termoeletrogravimetrico com caracteristicas especiais criadas pelo titular /13 ** n inventor sao ilustradas nos desenhos industriais anexo das figuras descritas no presente relatorio do qual e o objetivo da presente patente. Segundo a descricao deste processo a producao de metal de alta qualidade se da na propria jazida mineral que proporciona um resumo de 5 processos diminuindo custos de tratamento de minerio dos quais as seguintes terras minerais dos minerios metalicos sao incluidas neste processo: classificados em primeiro lugar como os mais dificeis de ser processados pela industria atual mas que por este processo eletroquimico de eletrogravimetria direto e indireto automatizado elimina os problemas de tratamento tanto na 10 tecnica como no meio ambiente alcançando a auto-suficiencia em producao de metais de alta qualidade. Os elementos de terra mineral concentrada que sao possiveis o seu tratamento sao estes, os que o PROCESSO ELETROGRAVIMETRICO DIRETO E INDIRETO processa com facilidade: os minerios que tem metais, combinados como os de: sulfetos, fosfetos, teluretos, 15 arsenietos, selenitos, antimonietos, sendo alguns metais combinados com os ametais e nao metais do grupo 14, 15, 16, 17 da tabela periodica. Sao estes os elementos complexantes que a industria mineral tem mais problemas de beneficiamento por serem cristalizados e totalmente insolúveis em acidos minerais sao descrito pela industria como interferentes, rebeldes e refratarios, 20 dai entao o autor titular desenvolveu atraves de suas experiencias de analise um meio especial de decompor este minerio e se extrair estes metais com facilidade sem emitir derivados toxicos na natureza diminuindo custos, vendo a possibilidade de implantar o sistema com tecnologia na industria sendo esta a diferenca de todos os outros processos ja conhecidos que neste processo 25 inventivo e desconhecido apresentado neste relatorio se consegue principalmente decompor esta terra mineral cristalizada e complexa extraindo os metais na presenca de seus interferentes como os elementos descrito acima via eletroquimica de eletrogravimetria e via termoeletrogravimetria diminuindo os custos sem emitir derivados toxicos na natureza entregando um produto 30 final metalico nobre ao mercado com pureza de composicao quimica elevada com a aplicacao industrial deste Processo Eletrogravimetrico Indireto e Direto /13 objetivo da presente patente. Os processos atuais sao conhecidos por tratar apenas elementos soluveis como os descritos a seguir: sulfatos, fosfatos, antimoniatos, bromatos, arseniatos, cloretos, nitratos. Neste processo tambem se processa os grupos descritos acima e este outro grupo com mais facilidade os: oxidos, boretos, carbonatos, nitretos, fluoretos, ou misturas complexas de todos estes descritos acima previamente moidos, serve ainda para

se tratar lixos industriais cujo rejeito e uma mistura complexa de metais pesados combinados ou nao com ametais utilizando de efeitos tecnicos como os criado neste processo onde se pode purificar oxido de manganês, separar metais pesados e raros fig. 120, e ainda ser utilizado para tratamento de esgoto. Exemplarmente demonstramos os metais associados complexamente ao ametal enxofre no minerio de Calcopirita que partindo deste composto o processo se estende para todos os outros minerais, figura 34, 51, 115, CuFeS_2 , sulfeto de cobre e ferro em sua maior composicao mas que em sua complexidade sao extraidos de sua conjugacao eletrônica por este processo separando dos atomos de qualidade nao metais e ametais existentes neste mineral contendo ainda outros metais como o zinco, cadmio, prata, ouro, paladio, cobalto, níquel, galio, indio, chumbo, manganês antimonio, germanio, estanho, bismuto, e outros como cromo, niobio, tungstenio, vanadio, em menor quantidade unidos com ametais e nao metais variados que atraves das tecnicas descritas neste relatorio serao separados quantitativamente pelo PROCESSO ELETROGRAVIMETRICO DIRETO E INDIRETO sendo recolhidos no compartimento (1) ou no compartimento (2) da celula 2, e 3, e 12 a 19, segundo o estagio de processo executado. PROCESSO ELETROGRAVIMETRICO DIRETO (182) E executado o processamento industrial da terra mineral de sulfeto sem nenhum outro tratamento no minerio primario a nao ser a moagem primaria moido o mais finamente possivel com a menor granulometria que se pode alcançar este minerio (16) adicionado diretamente nas CELULAS /13 V' ELETROGRAVIMETRICAS MINERAL descritas neste processo direto (182) como descreve o fluxograma da fig. 28 e 29 onde a extracao dos metais constituintes do minerio se da por forca eletrica via eletroquímica de eletrogravimetria ilustrada mais particularmente de forma panoramica na fig. 1. Neste novo metodo de processo criado pelo titular que estendeu suas pesquisas em sentidos opostos e audaciosos, o eletrolito pode ser complexo de composicao muito variada e cheia de interferentes e material solido suspenso, sendo esta uma das caracteristicas inventiva que diferencia este PROCESSO ELETROGRAVIMETRICO DIRETO dos atuais ja conhecidos. As Celulas apresentadas aqui como mostra as figuras anexas a este documento vem se caracterizar pelo processo direto por partir de uma extracao do metal diretamente decompondo o minerio bruto moido de origem CuFeS_2 , Calcopirita ilustrada na Figura 34, 51, 115 inicialmente adicionada a celula sendo uma inovacao onde se consegue retirar o metal com 99 percent de pureza fig 114, 116, e 119. PROCESSO DIRETO (182); utiliza dois modelos de celula, ou seja: CELULA ELETROGRAVIMETRICA ESTACIONARIA E MOVEL de caracteristica inventiva com especialidades diferenciada criadas pelo titular. A primeira denominada de CELULA ELETROGRAVIMETRICA ESTACIONARIA MINERAL ilustrada nas figuras 2, 3, 5, 7, 8, 53 e de 12 a 19 e 117, utilizando a metodologia de trabalho referente ao PROCESSO ELETROGRAVIMETRICO DIRETO. A outra denominada de CELULA ELETROGRAVIMETRICA VAGAO MOVEL ilustrada na figura 9, 31, 55 que utiliza a mesma metodologia de processo referente ao PROCESSO ELETROGRAVIMETRICO DIRETO mas com caracteristica movel trabalhando em movimento sobre trilhos de ferro. Por este processo se utilizar voltagens de tensao eletrica muito baixas ganha-se tempo e velocidade. Este processo contem um segredo de operacao criado pelo titular que em conjunto resulta em uma tecnica diferenciada nos estagios de processo de operacao para ser processado junto com um programa de automacao de todo este sistema, este programa de automacao resume em se ganhar velocidade de producao e controle remoto a longas distancias proporcionado conforto no controle do processo o que faz dele o cerebro do /13 processo descrito e anexo a este documento, AUTOMACAO DO PROCESSO ELETROGRAVIMETRICO DIRETO E INDIRETO. A terra mineral e adicionada na maquina (48) formadora de lama viscosa do minerio (181), onde e transportada por bombas ate o eletrodo (13) que e um eletrodo em forma de piso do compartimento (1) da maquina ilustrada na figura 2, 3, 7, 8, 9, 12, 13, 14, 15, 16, 17, 19, 53, 55 da CELULA ELETROGRAVIMETRICA MINERAL (3), esta maquina construida das formas apresentadas neste relatorio tem uma parede divisoria (9), que e mais particularmente ilustrada na figura 4 com alteracoes de construçao como ilustra a figura 54 e 57, a parede externa e interna que forma um unico recipiente de retencao do liquido quimico de eletrolito e construida de material inerte a ataques de acidos sendo de vidro, plastico, borracha fig. 2, 3, 5, 10, ferro fig. 9, ou concreto fig. 7, 8, 12, 15, 16, 19, revestidas internamente em um banho de piche ou borracha apropriada com a parede (9), com orificios de divisao (52), fig. 4, 54, 57, conforme a fig. 54 contem no interior nailon, e uma esponja (246), inerte a ataques quimicos embutidas em duas paredes construidas de material de plastico, borracha, vidro, e alvenaria com orificios (247) conforme a fig. 57 esta parede (9) e construida de alvenaria com orificio em forma de sifao (52) que permite a circulacao livre do eletrolito (14) em toda a celula separando o compartimento (1) do compartimento (2) para que nao permita que o solido mineral (16) em suspensao adicionado no compartimento (1) ultrapassar o compartimento (2), estabelecendo um unico estado quimico de PH em toda a celula evitando assim precipitacoes antecipadas. No compartimento (1) se processa a decomposicao do minerio (16), apos a tecnica de adicao lenta e controlada do eletrolito (14), que e composto de um acido formado pelo ametal de maior constituicao nesta terra mineral a ser processada, existente em sua complexidade da terra mineral fig. 1 item (37) extraida da jazida, que neste relatorio exemplarmente e um eletrolito composto de uma mistura complexa de metais e nao metais e ametais do grupo 8, 9, 10, 11, 12, 14, 15, 16, 17 descritos na tabela periodica internacional sendo os formadores de sais de enxofre, fosforo, Arsenio, antimonio, Telurio, Bromo, /13 y lodo, cloro, fluor, nitrogenio, e um teor de diversos metais e metais alcalino terroso constituintes da calcopirita descrita anteriormente que formarao um eletrolito complexo de: sulfatos, fosfatos, arseniados, bromatos, antimoniatos, teluretos, iodetos, cloretos, nitratos, fluretos, existindo estes elementos metais ametais e nao metais e alguns metais alcalinos terrosos na terra mineral em maior ou menor proporcao sendo que a maior proporcao sera neste caso a do enxofre que formara um eletrolito complexo em sua maior composicao de formula molecular basica de acido sulfurico H_2SO_4 e sulfato dos metais alcalino terroso como NaSCM KSCM que atingira um determinado valor de PH. Este eletrolito ao contrario de outras celulas existentes no mercado, nao podera sofrer movimentacao mecanica no momento de execucao destes estagios de processo inventivo, o unico movimento permitido e o movimento exercido pela liberacao das molecula em forma de gas nos eletrodos que serao absorvidos pelos elemento quimicos do minerio. No primeiro estagio que e executado particularmente na Celula Eletrogravimetria Mineral como em um processo de analise de laboratorio ilustrada na figura 2, 3, e um processo industrial para tratamento de milhares de toneladas de terra mineral diariamente ilustrado na figura 12, 13, 14, 15, 16, 17, 19, e na Celula Eletrogravimetria Movel Vagao Mineral ilustrada na figura 9, tera a adicao inicial de eletrolito composto de uma mistura de 35 percent em agua de acido Sulfurico e Sulfato de Sodio, podendo ser composto de carbonatos, cloretos, e outros e misturas destes, sendo que nas proximas operacoes do processo Eletrogravimetria se reutilizara do mesmo eletrolito que a cada operacao se tornara mais denso e concentrado devido a absorcao dos ametais e nao metais retirados da terra mineral por este processo o que e bom para o desempenho do processo, devendo este eletrolito em sua regeneracao simplesmente ser apenas filtrado e corrigido precipitando eletrogravimetricamente outros constituintes excessivos no sentido de dar espaco para se solubilizar nos proximos estagios os repetitivos elementos metalicos e derivados no proximo abastecimento de operacao eletrogravimetria de extracao. Pequena quantidade de sodio presente que transforma os ametais em acidos e sulfatos absorvendo e elevando a acidez em cada operacao melhorando o rendimento de energia que quanto mais o eletrolito for acido diminuira a resistividade eletrica do eletrolito em ohms, aumentando o poder de decomposicao diminuindo a forca E_d que da ganhos em energia KWh. CELULA ELETROGRAVIMETRICA MOVEL VAGAO MINERAL O processo de funcionamento da CELULA ELETROGRAVIMETRICA MOVEL VAGAO fig. 9, 31, 55, e iniciado seguindo a metodologia aplicada para o PROCESSO ELETROGRAVIMETRICO DIRETO DO PRIMEIRO ESTAGIO liga-se a chave (31) ajusta-se a polaridade dos eletrodos atraves da chave inversora (115) ajusta-se tambem a voltagem segundo a tensao de trabalho precisamente indicada por um calculo de equacao que pode ser calculado manualmente ou por um programa de automacao descrito neste relatorio PROCESSO DE AUTOMACAO, sendo que a tensao E_d , de pressisao depois de calculada pode ser ajustada manualmente pela chave (32) que proporciona uma varredura de voltagem sem alterar a amperagem de trabalho. Este projeto de digitalizacao das celulas deste processo e mais bem ilustrado na figura 24. CELULA MOVEL demonstrando que o processo direto descrito neste relatorio pode ser executado em uma celula movel fig. 9 e 55 que tem rodas de ferro (56) e se movimenta sobre trilhos (57) contendo as mesmas indicacoes principais da celula da fig. 2 e 3 que tem a mesma qualificacao somente a estrutura desta celula ou seja a caixa recipiente (3) de que e formada utiliza material de chapas de ferro revestida interiormente de borracha contra ataques quimicos de acido dividida por uma parede (9) e fig. 54 e fig. 57, ja descritas acima em dois compartimentos (1) e (2) utilizando de dois eletrodos laterais (5) que sao pendurados em ganchos que sao fixados a uma balanca digital (6) nos dois compartimentos laterais (2) onde se precipita o metal extraido (49) que sera retirado pelas tampas inferior (55), contem um eletrodo em forma de piso (13) no compartimento central (1) onde e adicionado o minerio moido (16) /13 £ cerca de 200 a 500 toneladas de minerio primario moido abastecido pela abertura da tampa de ferro superior (53) e descartado apos o seu processamento pela abertura das tampas inferior (54) alimentada por forca eletrica externa de corrente continua do circuito da figura 23 digitalizada 5 segundo o desenho da figura 24, seu movimento e feito por maquinas diesel como as convencionais ja conhecidas, seu processo de trabalho esta ilustrado mais particularmente na figura 31 deste processo descritivel, onde centenas de Celula Eletrogravimetria Movel Vagao Mineral do Processo (182) Direto percorre em serie sobre trilhos de ferro (57) em forma de circulo para a 10 execucao do processo. Pode-se visualizar nesta ilustracao da fig. 31 e 55 a celula de indicacao (161) que e abastecida na estacao (165) com minerio moido e eletrolito indicado para o processo seguindo em sentido anti-horario, a celula movel de indicacao (162) em meio ao processo ja quase completado, a celula movel de indicacao (163) estaciona na estacao (158) esta em processo 15 de descarte do eletrolito no tanque (160) seguindo em frente onde vemos a celula movel (164) descarregando o metal e o hidroxido do metal descartando o rejeito prosseguindo em frente e lavada na estacao (159) despejando os residuos em tanque apropriado. Nos dois tipos de celulas

se executa os estagios descritos nos fluxogramas das fig. 37 a 41 que de acordo com a 20 necessidade e as características do minerio se opta para o mais conveniente como por exemplo; no estagio em que se optou por decompor os elementos que nao se solubilizarao no primeiro estagio sendo os metais nobres decomposto em um quinto estagio fig. 41, onde se extraiu os nobres fig. 120. 25 PROCESSO ELETROGRAVIMETRICO INDIRETO (183) E executado o processamento industrial de tratamento da terra mineral da seguinte forma: que alem da moagem primaria antes de qualquer outra operacao dentro das Celulas se opera uma fundicao instantanea do minerio de 30 sulfeto previamente dosado com um determinado peso calculado em tonelada sendo uma terra mineral concentrada de minerio de Calcopirita CuFeS_2 , figura 9/13 34 Sulfeto de Ferro e Cobre que e decomposto de sua ligacao eletronica conjugal com outros elementos como o ametal de enxofre por uma descarga de Plasma eletrico de corrente continua e disparo de inducao de Altafrequencia que juntas estas duas forcas num lapso de tempo separa os seus constituintes metais, nao metais, ametais em um forno especial figura 21 e 50 de natureza inventiva parecido com os que ja existem no mercado mas com especialidades diferenciadas dos existentes nos fornos conhecidos pelo estado da tecnica. O resultado da fundicao eletrogravimetrica e uma liga metalica qualitativamente e quantitativamente complexa com um determinado peso e densidade fisica, esta liga e extraida por forca eletrica via termoquimica e eletrotermia no Forno Termoeletrogravimetrico contendo metais variados, sendo exemplarmente os de maior proporcao, o ferro e o cobre no caso da calcopirita, que e laminada de acordo com sua composicao e o seu metal de enquadramento para ser facilmente desintegrada e totalmente decomposta no compartimento (1) na Celula Eletrogravimetrica Estacionaria Mineral (3) descrita neste processo na figura 20 proporcionando a entrega de um produto nobre dos metais de cobre, niquel, zinco, ferro, antimonio, prata, cadmio, estanho, ouro, paladio, prata, platina e outros metais raros ou seminobres com grau de pureza elevada segundo o minerio de origem a se tratar por este processo. ALTA VELOCIDADE Ainda descrevendo o processo indireto, este processo pode ser de alta velocidade no que se refere a fundicao termoeletrogravimetrica onde a velocidade de producao e controlada por um programa de automacao descrito neste relatorio que utiliza um FORNO ESTACIONARIO descrito na figura 21 e de outro FORNO ROTATIVO (89) descrito na figura 22 e 38 que juntamente com um DIGESTOR CENTRIFUGO (75) e LAVADOR DE VAPOR E DE GAS (70) e um FILTRO HIDRAULICO (81) que proporciona a solubilizacao dos metais constituintes da terra mineral produzindo um eletrolito complexo que e filtrado separa do rejeito fazendo com que estes metais existentes neste eletrolito sejam extraidos separadamente pelo PROCESSO INDIRETO com ALTA VELOCIDADE. Este conjunto de procedimentos que a partir deste 10/13 PROCESSO ELETROGRAVIMETRICO DIRETO E INDIRETO AUTOMATIZADO criado pelo titular inventor, tornou-se possivel sua viabilidade e implantacao na industria mineral para a extracao dos metais de maior interesse economico a partir das invencoes tecnicas de marchas e estagios diferenciados implantados pelo titular neste processo e uso das maquinas ilustradas nos desenhos anexos sendo um conjunto panoramico mostrado da figura 1 ate a 58 proporcionando assim dois metodos distintos de trabalho na mesma invencao denominado de PROCESSO DIRETO E INDIRETO. AUTOMACAO DO PROCESSO ELETROGRAVIMETRICO DIRETO E INDIRETO Fundamento de um dispositivo tecnico de comando das maquinas e apresentadas neste relatorio e execucao programado deste processo para surtir o efeito de decompor o minerio e extrair metais no estado solidos e ametais no estado soluveis em forma de acido ou bases onde os comandos das maquinas que sao controlados por processo de metodologia de automacao digitalizada e controles automaticos remoto de longas distancias por computador apresentado de maneira panoramica em um processo inovador de natureza inventivo neste relatorio deste PROCESSO ELETROGRAVIMETRICO DIRETO E INDIRETO AUTOMATIZADO. Portando o objetivo da presente invencao de processo eletrogravimetrico automatizado e diferenciado por tecnica inventivas criadas para executar este processo trazendo conforto e precisao promovendo uma produtividade programada e controlada de perto e a longas distancias de conformidade com as normalidades tecnicas internacionais e o meio ambiente. E diferenciado por processar com auxilio de um metodo de automacao que executa os comandos das maquinas e seus estagios de trabalho descritas neste processo de maneira programada, que digitaliza todas as informacoes fisicas quimicas monitoradas e comandado por operarios que em frente ao computador fig. 69 tem cada um a funcao de cuidar de uma respectiva tarefa do processo em funcionamento como ilustra as figuras de 66 a 113, monitorando informacoes sobre a: formula quimica 11/13 / qualitativa e quantitativa e densidade do minerio bruto e posteriormente moido e sua quantidade em peso a ser processada em um determinado tempo, a quantidade de sais solubilizados e a formula quimica e a resistencia ohmica, PH do eletrolito utilizado e as moleculas, metalicas disoltas solubilizadas no eletrolito no momento de trabalho, informando sobre o abastecimento de liquidos e solidos de maneira precisa e detalhadamente a estocagem dos liquidos e solidos, informando precisamente: a quantidade de metal existente antes da extracao e a producao por dia, mes e ano de metais de acordo com a energia gasta para producao em TN, pela potencia gasta para produzir em KWh, e derivados ametais e nao metais, e sua estocagem diaria e mensal, diferenciado por informar: a energia de potencia aplicada, a velocidade de producao em toneladas hora, o custo e o rendimento do processo, a temperatura de trabalho, a reposicao de eletrodos, sua composicao quimica, a concentracao de sal em decomposicao no compartimento e (1) e a concentracao de sais no compartimento (2) diferenciado por calcular automaticamente os valores de grandeza fisica de eletricidade, Ed, Rd, Ad, Wd, Hzd, Er, E/i, degrees Cd, de maneira sincronizadas para conseguir extrair com precisao um determinado metal e compor automaticamente a formula quimica do eletrolito regulando o carater acido ou basico em PH, e a resistencia ohmica adicionando liquido neutro, acido e basico, para ser possivel a extracao de um dado metal. Um segredo de sistema de varredura da tensao de decomposicao definidos em pontos infinitos de comando de graficos e tabelas anexas criado para execucao do processo eletrogravimetrico direto e indireto de forma automatizada e digitalizada de maneira remota na sala de comando por computador ou a longas distancias. Obtendo todas as informacoes de grandezas fisicas e quimicas de maneira digital e computadorizada que se pode controlar o sistema e funcionamento das maquinas programando de maneira automatica toda a operacao prevendo antecipadamente a producao em peso de tonelada hora, dia e mes e a reposicao da materia prima mineral e estoque de aditivos quimicos como controlar todo o sistema a longa distancia recebendo todas as informacoes de grandezas fisico quimicas de maneira /13 precisa. MONITORAMENTO: no quadro digital podemos visualizar no painel digital fig. 36, os acontecimentos fisico-quimicos dentro da celula e aplicacao das grandezas e os resultados de efeito. No quadro digital TN/h, observemos os digitos da balanca (6) em sentido crescente informando que o metal esta se 5 depositando. No quadro Wd visualizamos os digitos decrescentes da energia em Kwh exemplo: 3.675.000 KWh para se extrair 40.902 TN de metal que quando terminar a extracao os digitos do painel sera zerado da seguinte forma: 00.000.000 KWh, entao soa o alarme avisando que o processo foi concluido com sucesso, resultando um produto como ilustra a fig. 114 em que o eletrodo 10 esta com uma camada grosseira e rugosa com cobre oxido hidratado de formula CuO de precipitado vermelho pigmentado aderido ao eletrodo ou acumulado no fundo do compartimento (2) da celula eletrogravimetrica estacionaria e movel vagao, como ilustra a fig. 118 representando o precipitado hidratado despejado sobre um papel e a fig. 119 sendo que o eletrolito se 15 altera com a acao do ar (345) em que o precipitado e um mistura de flores metalicas de Cu (344) e flores de CuO (49) no fundo da celula com teor de 99 percent de pureza. E de outra forma como ilustra a fig. 116 onde o elemento metalico foi extraido de forma metalica aderido ao eletrodo (5), extraidos pelo processo eletrogravimetrico direto e indireto, numa plataforma operacional 20 como ilustra a fig. 32, e todos os desenhos anexo de 1 a 120. O presente processo e passivel de ser utilizado em diferentes processos de mineracao e em pesquisas em todo mundo na mineracao industrial e na determinacao de metais partindo do minerio de origem, em diversos laboratorios na producao em larga escala de alta demanda de extracao de metal de refino eletroquimico 25 e termoquimico e outros derivados como o hidroxido do metal CuOH e oxido anidro de CuO de interesse economico com teores de purezas em torno de 99 percent este projeto constitui uma revolucao na industria mineral eletroquimica e termoquimica na eletro-fundicao mineral industrial, com ele e possivel tratar milhares ou ate milhoes de toneladas dia de minerio primario moido, extrair 30 milhoes de toneladas de metal refinado diariamente em uma operacao que corresponde de um a cinco estagios de processo altamente controlado e 13/13 monitorado por sistema automaticos alarmes e sensores de um programa de computador especifico de automacao anexo. Sem emitir derivados toxicos na atmosfera como os gases de enxofre e outros o mesmo nao produz derivados toxicos de lixo industrial de rejeitos na natureza como as de piche em comparacao ao petroleo que em larga producao nao se encontra solucao para se livrar deles e quando acha e a queima deste composto absorvendo o oxigenio do ar o que e nocivo em contra partida este processo protege o oxigenio do ar retendo os ametais gasoso que sao toxicos, porque a presente invencao e ambientalista. Este processo e de custo baixo de producao nao cria derivados toxicos que devam ser emitidos na atmosfera e na natureza e os custos do processo e altamente economico comparado com a producao eletrotermica do aluminio que para se extrair uma tonelada de aluminio se gasta 17.803 kwh por tonelada em contra partida este novo metodo sendo que com o PROJETO ELETROGRAVIMETRICO, se consegue extrair uma tonelada de cobre com apenas 2.548 Kwh por tonelada executando o PROCESSO DIRETO e 4.572 kwh por tonelada executando o PROCESSO INDIRETO. Neste resumo pode melhor entender de maneira geral com as ilustracoes dos fluxogramas panoramico 28, 29, de execucao do processo os fluxogramas das fig. 37 a 43 e da automacao do processo os fluxogramas da fig. 66 a 72 e a ilustracao das figuras 1, e 32 que apresentam a montagem da plataforma. Todos os elementos da tabela periodica internacional podem ser extraidos de sua conjugacao complexa mineral pelo processo eletrogravimetrico direto e indireto descrito neste relatorio no estado soluvel, liquido, solido, gasoso, ou solido metalico anidro e umido hidrometalica amorfo, nas maquinas descritas neste relatorio como as celulas eletrogravimetrica estacionaria e movel fig. 2 e 3 e 9, 12 a 19, e forno termoeletrogravimetrico estacionario ou rotativo invertendo as polaridades eletricas dos eletrodos e utilizando estagios de processo correspondentes

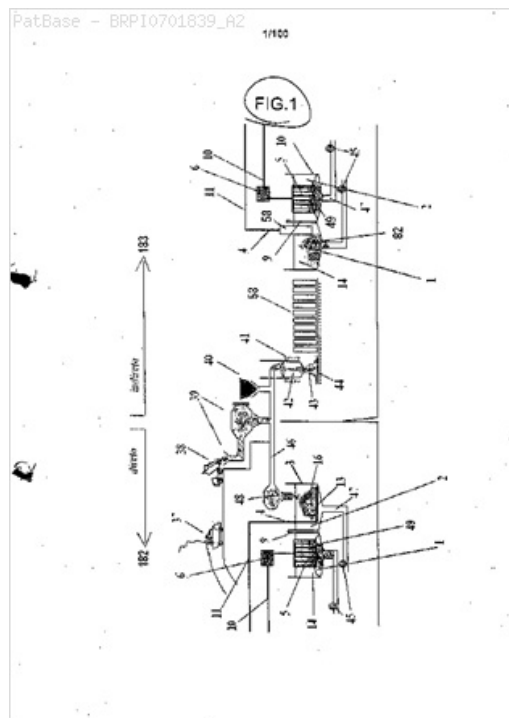
aplicando força elétrica externa BT e MAT de corrente contínua e força elétrica de alta frequência em KHz e MHz em KWh, fornecidos pelos circuitos da fig. 23, 25, 27. **Machine translation:** Pf old-percent 1/13 SUMMARY PROCESS DIRECT AND INDIRECT ELETROGRAVIMETRICO AUTOMATED belongs to the field of mining industry, electrochemical, electrothermal industrial thermochemical and more particularly to an electrochemical process Electrogravimetry and termoeletrogravimetrico applied to production of high metals quality from the mineral industry and a new method of mineral land treatment process, concentrated, exemplarily the ore sulfide CuFeS₂, Chalcopyrite, copper sulfide and iron, performed on cells machines as illustrated in Figs. 2, 3, 5, 8, 9, 12-19 and 117, the execution of the direct process and the machinery of Figures 21, 22, 50, 48 execution of indirect process understood generally in the flow charts of Figures 28 and 29 and operational flow charts of FIGS. 37 to 43, can be better understood from a panoramic view from above see Fig. 32 illustrating assembly of the operating platform resulting in the extraction gravimetric of the constituent metals in the earth mineral separating their conjugation electronics with ametais as sulfur, arsenic, tellurium, and the non-metals of interest periodic table executed by eletrogravimetrico process direct and indirect. This invention as a process of extracting metals and their corresponding metal hydroxide, directly via electrochemical Electrogravimetry to cell Eletrogravimetria Mineral Fig. 2, 3, and indirectly via instant foundry mineral land Oven Termoeletrogravimetrico fig. 21, 48, 50 resulting in complex alloy which is then decomposed by Eletrogravimetry its constituents are separated by this process starting from this primary ore source together with a set of inventive machine shown in figures 1 to 120 attached, of which executes the present PROCESS ELETROGRAVIMETRICO DIRECT AND INDIRECT and these machine-Cells electrochemical of Electrogravimetry and Termoeletrogravimetrico oven with special features created by the holder / 13 ** n inventor are illustrated in the attached industrial designs of the figures described in this report and which the objective of this patent. According to the description of this process the high-quality metal production from the in own mineral deposit which provides a summary of five cases decreasing ore treatment costs of which the following mineral lands of ores metallic are included in this process: Classified in first as the most difficult to be processed by the current industry but for this electrochemical process of direct Electrogravimetry and automated indirect eliminates the treatment of problems in both the 10 technical as the environment reaching self-sufficiency in production of high quality metals. The elements of earth mineral concentrate that possible are your are treating these, the PROCESS ELETROGRAVIMETRICO DIRECT AND INDIRECT processes with ease: the ores that have metal combinations such as: sulfides, phosphides, tellurides, 15 arsenides, selenites, antimonietos It is combined with some metals and non-metals ametais group 14, 15, 16, 17 of the periodic table. Are these complexing elements that the mineral industry has more processing problems to be crystallized and completely insoluble in mineral acids are described by the industry as interfering, rebels and refractory, 20 give then the author holder developed through their experiences of analysis a special medium to decompose this ore and extract these metals easily without emitting toxic derivative in nature reducing costs, seeing the possibility of introducing the system with technology in the industry and this is the difference from all other processes known already that this process 25 inventive and unknown displayed this report is achieved mainly decompose this crystallized and complex mineral land extracting metals in the presence of its intervening as the elements described above via electrochemical of Electrogravimetry and via termoeletrogravimetria lowering costs without emitting toxic derivative in nature delivering a product 30 final noble metallic market with high purity chemical composition with the industrial application of this process Eletrogravimetrico Indirect and Direct / 13 goal of this patent. The current processes are known to treat only soluble elements as those described following: sulfates, phosphates, antimonates, bromates, arsenates, chlorides, nitrates. In this process also renders the groups described above, and this other group more easily to: oxides, borides, carbonates, nitrides, fluorides, or complex mixtures thereof described above previously milled, still serves for treating industrial waste which reject and complex mixture of heavy metals combined or not with ametais using technical effects as created in this process where you can purify manganese oxide, separating heavy metals and rare fig. 120, and still be utilized for sewage treatment. Exemplarmetente demonstrated metals associated complexly the non-metal sulfur in the ore chalcopryrite that, starting from this compound the process extends to all other minerals, figure 34, 51, 115, CuFeS₂, copper and iron sulfide for the most makeup but in its complexity are extracted from their electronic conjugation through this process apart from not quality atoms metals and ametais existing in this mineral containing also other metals such as zinc, cadmium, silver, gold, palladium, cobalt, nickel, gallium, indium, lead, manganese antimony, germanium, tin, bismuth, and others like chromium, niobium, tungsten, vanadium, in less united with ametais and not different metals that through the techniques described in this report will be separated quantitatively by PROCESS ELETROGRAVIMETRICO DIRECT AND INDIRECT being collected in the compartment (1) or compartment (2) of the cell 2, and 3, and 12 to 19 second stage of the process run. PROCESS ELETROGRAVIMETRICO DIRECT (182) and run the industrial processing of mineral earth sulfide with no other treatment in primary ore to not be the primary ground grind as finely as possible with the smallest particle size that can be achieved this ore (16) added directly to the CELL / V 13 'ELETROGRAVIMETRICAS MINERAL described in this straightforward process (182) as described in the flowchart of Fig. 28 and 29 where the extraction of the constituents of ore metals are the electric force by way of electrochemical Electrogravimetry illustrated more particularly panoramic form in Fig. 1. In this new process method created by the owner who extended their research on opposite and audacious way, the electrolyte can be makeup complex varied and full of interfering and suspended solid material, which is one of inventive features that sets this PROCESS ELETROGRAVIMETRICO DIRECT current known already. The cells shown here as shown in the figures attached to this document has been characterized by the direct process from a metal extraction directly decomposing the raw ore milled to CuFeS₂ origin Chalcopryrite illustrated in Figure 34, 51, 115 initially added the cell being one where innovation can remove metal with Figure 99 percent purity 114, 116, and 119. Process stream (182); It uses two models of cell, ie: CELL ELETROGRAVIMETRICA mobile and stationary inventive feature with different specialties created by the owner. The first named cell ELETROGRAVIMETRICA stationary MINERAL illustrated in Figures 2, 3, 5, 7, 8, 53 and 12 to 19 and 117, using the working method relating to CASE ELETROGRAVIMETRICO DIRECT. The other known cell ELETROGRAVIMETRICA MOBILE wagon illustrated in Figure 9, 31, 55 using the same process methodology regarding the process ELETROGRAVIMETRICO DIRECT characteristic but with mobile working movement on iron trills. By this process using very low voltages of electric tension you gain time and speed. This process contains a secret of operation created by the holder which together results in a different technique in the operation process stages to be processed along with an automation program of the whole system, this automation program boils down to is winning production speed and remote control over long distances provided comfort in the process control making it the brain of / 13 process described and attached to this document, AUTOMACAO PROCESS DIRECT AND INDIRECT ELETROGRAVIMETRICO. The mineral land and added to the machine (48) viscous mud forming of ore (181), where and transported by pumps until the electrode (13) and an electrode in compartment floor in order (1) of the illustrated machine in figure 2, 3, 7, 8, 9, 12, 13, 14, 15, 16, 17, 19, 53, 55 of the cell ELETROGRAVIMETRICA MINERAL (3), this machine constructed forms presented in this report has a dividing wall (9), which is more particularly illustrated in Figure 4 with alterations of construction as illustrated in Figure 54 and 57, the external and internal wall forms a single holding vessel the chemical electrolyte liquid is constructed of an inert material to acid attacks and glass, plastic, rubber fig. 2, 3, 5, 10, Fig iron. 9 or Fig concrete, 7, 8, 12, 15, 16, 19, internally coated with a tar bath or suitable rubber with the wall (9) with orifices for division (52), Fig. 4, 54, 57, as shown in Fig. Nylon 54 contains in the inside, and a sponge (246), inert to chemical attacks embedded in two walls constructed of plastic material, rubber, glass, and masonry with orifices (247) as shown in Fig. 57 this wall (9) is constructed of masonry with hole-shaped siphon (52) that allows free circulation of electrolyte (14) across the cell separating compartment (1) (2) compartment that does not allow the solid mineral (16) in suspension added into the compartment (1) exceeds the compartment (2), establishing a single chemical state of PH throughout the cell thus avoiding anticipated rainfall. On the compartment (1) proceeds the decomposition of the ore (16) following the technique of slow and controlled addition of the electrolyte (14), which is composed of an acid formed by the largest constitution AMETAL this earth mineral being processed, existing in its complexity of mineral land fig. 1 item (37) extracted from the mine, which in this report exemplarily and electrolyte composed of a complex mixture of metals and non metals and ametais the group 8, 9, 10, 11, 12, 14, 15, 16, 17 described in the table international periodic being formers sulfur salts, phosphorus, arsenic, antimony, tellurium, bromo, / 13 y sludge, chlorine, fluorine, nitrogen, and a content of various metals and alkaline earth metal constituents of the chalcopryrite described above to form an electrolyte complex: sulfates, phosphates, arsenates, bromates, antimonates, tellurides, iodides, chlorides, nitrates, fluretos and there are these metal elements ametais and not metals and some alkaline earth metals in mineral soil in varying proportion with the largest proportion will be in this case the sulfur that had formed a complex electrolyte composition for the most basic molecular formula of sulfuric acid H₂SO₄ and sulfate of alkaline earth metals such as NaSCM KSCM which had reached a certain PH value. This electrolyte unlike other existing cells in the market will be able not suffer movement mechanics at the time of execution of these inventive process stages, the only permitted movement and the movement exerted by the release of the molecule in the form of gas at the electrodes that will be absorbed by the chemical element the ore. On the first stage which is carried out particularly in the cell Eletrogravimetria Mineral as a laboratory analysis process illustrated in Figure 2, 3, and an industrial process for treatment of thousands of tons of daily illustrated earth mineral in Figure 12, 13, 14, 15, 16, 17, 19, and the cell Eletrogravimetria Mobile wagon Mineral illustrated in Figure 9, will have the initial addition of electrolyte composed of a mixture of 35 percent in water of sulfuric acid and sodium sulphate and may be composed of carbonates chlorides, and others and mixtures thereof, and the next operations of reuse is Eletrogravimetrico process of the same

electrolyte that each operation became denser and more concentrated due to absorption of ametais and not metals from the mineral earth by this process what and good for process performance and should this electrolyte in its regeneration simply just be filtered and corrected eletrogravimetricamente precipitating other excessive constituents in order to give space to solubilize in the next stages repetitive metallic elements and derivatives in the next supply eletrogravimetrica of extraction operation. Small amount of this sodium that turns ametais in acids and sulfates absorbing and increasing the acidity in each operation improving the efficiency of energy that the more the electrolyte is acid had decreased the electrical resistivity of the electrolyte in ohms, increasing the power of decomposition decreasing strength ed that the gains in KWh energy. MOBILE CELL ELETROGRAVIMETRSCA wagon MINERAL The operating procedure of ELETROGRAVIMETRICA CELL MOBILE wagon fig. 9, 31, 55, and start following the methodology applied for the PROCESS ELETROGRAVIMETRICO DIRECT FROM STAGE FIRST binds the key (31) sets the polarity of the electrodes through the inverter switch (115) fits also the voltage according to working voltage precisely indicated by an equation of calculation that can be calculated manually or by an automation program described in this report process automation, and the voltage Ed of pressisao after calculated can be adjusted manually by the switch (32) which provides a voltage sweep without changing the amperage of work. This digitalization project of the cells of this process and best illustrated in Figure 24. CELL MOBILE demonstrating that the direct process described in this report can be run on a mobile cell Fig. 9 and 55 which have iron wheels (56) and moves over rails (57) containing the same main indications of the cell of Fig. 2 and 3 having the same qualification only the structure of the cell that is the container housing (3) that is formed using iron sheet material coated on the inner rubber against chemical attacks divided acid by a wall (9) and Fig. 54 and Fig. 57, already described above in two compartments (1) and (2) utilizing two side electrodes (5) are hanging from hooks that are attached to a digital balance (6) on the two lateral compartments (2) which precipitates the metal extracted (49) that will be taken by the lower lids (55), contains an electrode-shaped floor (13) in the central compartment (1) where and add the crushed ore (16) / 13 £ about 200-500 tons of ore primary ground supplied by opening the upper iron cover (53) and disposed after the processing for opening the lower lids (54) fed by force current of external electric continues the circuit of Figure 23 digitized 5 according to the design of Figure 24, its movement and made by diesel machinery as conventional already known, their work process is illustrated more particularly in Figure 31 this describable process, where hundreds of Celula Eletrogravimetrica Mobile wagon Mineral Process (182) Direct runs in series on iron rails (57) shaped circle for 10 execution of the process. One can view this illustration of Fig. 31 and 55 the cell of indication (161) which is supplied in the season (165) with crushed ore and electrolyte suitable for the process followed in anti-clockwise, the mobile cell of indication (162) amid the almost completed already process, the mobile cell of indication (163) park in the station (158) is in process 15 electrolyte disposal in the tank (160) moving forward where we see the mobile cell (164) discharging metal and metal hydroxide discarding the waste proceeding ahead and washed in a season (159) dumping the waste in an appropriate tank. In both types of cells is performed the stages described in the flowcharts of FIGS. 37 to 41 to 20 according to need and the characteristics of the ore is to choose the most convenient for example; the stage at which it was decided to break down the elements that are not solubilizarao in the first stage being the noble metals decomposed into a fifth stage Fig. 41, where they extracted the noble fig. 120. 25 PROCESS ELETROGRAVIMETRICO INDIRECT (183) and run the industrial processing treatment of mineral land as follows: that beyond the primary grinding before any other operation within Cells operates one instant foundry of ore than 30 sulfide previously dosed with a certain weight calculated in ton and a concentrated mineral earth ore of Chalcopyrite CuFeS_2 , figure 9/13 34 Sulfide Iron and Copper decomposed and that of their married Electronic Link with other elements such as sulfur non-metal by an electric plasma discharge direct current and Altafrequencia induction shooting that together these two forces in a period of time separating their constituent metals, non metals, ametais in a special figure oven 21:50 inventive similar nature to those which already exist in the market but with different specialties existing in ovens known to the state of the technique. The result of eletrogravimetrica foundry and a qualitatively and quantitatively complex alloy with a certain weight and physical density, this alloy and extracted by force electric via thermochemical and electrotherm in Termoeletrogravimetrico oven containing various metals, exemplary being the highest proportion, iron and Copper in the case of chalcopyrite, which is laminated according to their composition and their enqartacao metal to be easily disintegrated and completely decomposed in the housing (1) in cell Eletrogravimetrica Stationary Mineral (3) described in the process in Figure 20 providing the delivery a noble product of copper metal, nickel, zinc, iron, antimony, silver, cadmium, tin, gold, palladium, silver, platinum and other precious metals or seminobres grade high purity according to the original ore to be treated by this process. HIGH SPEED yet describing the indirect process, this process can be high speed in relation to termoeletrogravimetrica foundry where production speed and controlled by an automation program described in this report using a stationary OVEN described in figure 21 and another rotary kiln (89) described in Figures 22 and 38 together with a digester centrifuge (75) and steam WASHER AND GAS (70) and a hydraulic filter (81) providing solubilization of the constituent metals of mineral breeding ground a complex electrolyte that separates the waste filtered and making these metals exist in this electrolyte are extracted separately by INDIRECT PROCESS with SPEED. This set of procedures that from this 10/13 PROCESS DIRECT AND INDIRECT ELETROGRAVIMETRICO AUTOMATED created by the inventor holder became possible viability and implantation in the mineral industry for the extraction of greater economic interest metals from the techniques of speed and inventions different stages deployed by the holder in this process and use of the machines illustrated in the accompanying drawings be a panoramic assembly shown in Figure 1 to 58 thus providing two distinct working methods in the same invention called PROCESS DIRECT AND INDIRECT. AUTOMACAO PROCESS ELETROGRAVIMETRICO DIRECT AND INDIRECT basis of a command of technical device of machines and presented in this report and scheduled execution of this process to bear fruit the effect of decomposing the ore and extract metals in solids and ametais state in soluble state in the form of acid or base where the controls of machines that are controlled by automation methodology process scanned and automatic remote controls long distances presented by computer panoramic way in an innovative process for inventive nature in this report this ELETROGRAVIMETRICO PROCESS DIRECT AND INDIRECT AUTOMATED. Carrying the objective of this eletrogravimetrico automated process of invention is distinguished by inventive technique created to perform this process bringing comfort and precision promoting a scheduled productivity and closely monitored and the long distances in accordance with international techniques normality and the environment. And differentiated by process automation with the aid of a method of performing the commands of the machines and their stages of work on a scheduled basis described in this process, which scans all chemical physical informations monitored and controlled by operatives that at the computer fig. 69 each have the function of caring for a respective task of the process running as illustrated figures 66-113, monitoring informations about: chemical formula 11/13 / quality and quantity and density of the raw ore and subsequently ground and quantity by weight to be processed at a given time, the amount of salts solubilized and the chemical formula and the ohmic resistance, PH used electrolyte and molecules, Metal disoltas solubilized in the electrolyte at the time of work, reporting on the supply of liquids and solids accurately and in detail the storage of liquids and solids, stating precisely, the amount of metal before the extraction and production a day, month and year according to energy metals spent for production in TN, the power expended to produce in KWh, and derivatives ametais and not metal, and your daily and monthly storage, differentiated by state: the power of energy applied, the production rate in tons hour, the cost and efficiency of the process, the working temperature, the spare electrodes, their chemical composition, the salt concentration in decomposition in the compartment and (1) and the concentration of salts in the compartment (2) differentiated by automatically calculating the physical magnitude values of electriciry, Ed Rd, Ad, Wd, HZD Er, I / i, degrees CDs, synchronized way to get draw with accuracy a given metal and automatically compose the chemical formula of the electrolyte regulating the character acidic or basic in pH, and ohmic resistance by adding neutral liquid, acid and basic, to be possible the extraction of a given metal. A scanning system secret of decomposition of voltage defined in infinite points of graphic command and attached tables created for execution of the direct and indirect eletrogravimetrico process in an automated manner and scanned remotely on a computer control room or over long distances. Getting all the information from physical and chemical quantities of digital and computerized way you can control the system and operation of the machines scheduling of automatic way the whole operation providing advance the production by weight ton of hours, days and months and spare the raw material mineral and chemical additives such as inventory control the entire system a long distance getting all the information from physical quantities of chemical way / 13 needs. MONITORING: the digital frame can display on the dashboard fig. 36, the physical-chemical events within the cell and application of the quantities and the results of effect. In the digital frame TN / h, observe the digits of balanca (6) in direction grew up stating that this metal is deposited 5. As part Wd visualize the decreasing digits of energy in kWh example: 3,675,000 KWh to extract 40,902 TN of metal that when you have finished extracting the digits panel will be reset as follows: 00 million KWh, then sounded the alarm warning that the process was completed successfully, resulting in a product as shown in Fig. 114 in which the electrode 10 is with a coarse and rough layer with copper oxide hydrated CuO formula of pigmented red precipitate adhered to the electrode or accumulated in the compartment floor (2) eletrogravimetrica cell stationary and mobile wagon, as illustrated in Fig. 118 representing the precipitate hydrated poured onto paper and Fig. 119 wherein the electrolyte is 15 changes with the action of air (345) in which the precipitate and mixing metallic flowers Cu (344) and flowers CuO (49) in the cell bottom with a 99 percent content of purity. And otherwise as shown in Fig. 116 where the metallic element has been extracted from metal adhered to the electrode medium (5) extracted by direct and indirect eletrogravimetrico process, an operating platform 20 as shown in Fig. 32, and all the attached drawings from 1 to 120. This

process is likely to be used in different mining processes and research worldwide in industrial mining and determination of metals starting from the origin of ore in several laboratories in production large-scale high demand for refining metal extraction electrochemical 25 and thermochemical and other derivatives as metal hydroxide CuOH and anhydrous oxide of economic interest CuO with purity levels around 99 percent this project constitutes a revolution in the mineral industry electrochemical and thermochemical industrial mineral electro-foundry, with him it is possible to treat thousands or even millions of tons per day of ore primary ground, extract 30 million tons of refined metal every day in an operation that corresponds to one to five highly controlled process stages 13/13 and monitored by automatic system alarms and sensors of a specific computer program attachment automation. Without issuing derived toxic in the atmosphere as sulfur gases and other it does not produce toxic derived from industrial waste tailings in nature as tar as compared to the oil that large no production is solution to get rid of them and when you think and the burning of this compound by absorbing oxygen from the air what is harmful to starting this process protects the air holding the oxygen gas ametais that are toxic, because the present invention and environmentalist. This process and cost of production does not create toxic derivatives that are to be emitted into the atmosphere and the nature and process costs and highly economical compared to the electrothermal production of aluminum that in order to extract an aluminum ton is spent 17,803 kwh per ton counter starting this new method being that with ELETROGRAVIMETRICO DESIGN, one can extract a ton of copper with only 2,548 Kwh per ton running DIRECT PROCESS and 4,572 kwh per ton running INDIRECT PROCESS. In this summary you can better understand generally with panoramic illustrations of flowcharts 28, 29, execution of process flow charts of FIGS. 37-43 and automation of process flow charts of Fig. 66 to 72 is the illustration of figures 1 and 32 which show the assembly of the platform. All elements of the international periodic table can be extracted from its mineral complex conjugation by direct and indirect eletrogravimetrico process described in this report in the soluble state, liquid, solid, gaseous, or solid anhydrous metallic and moist amorphous hidrometalica, the machines described in this report as eletrogravimetrica cell stationary and mobile fig. 2:03 and 9, 12-19, and oven termoeletrogravimetrico stationary or rotating reversing eletricas polarities of electrodes and using corresponding process stages applying force external electric BT and current MAT continues and electric strength of high frequency in KHz and MHz in KWh, provided by the circuitry of Fig. 23, 25, 27.

Classifications:

International (IPC 8-9): C22B1/00 C25C1/00
H05B6/02 (Advanced/Invention);
C22B1/00 C25C1/00 H05B6/02 (Core/Invention)
CPC: Y02P10/234 Y02P10/253



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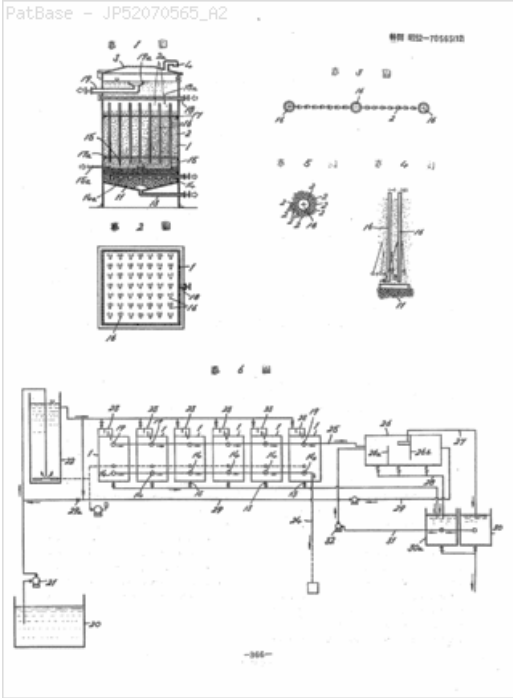
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Title: METHOD OF AND APPARATUS FOR PURIFYING SANITARY SEWAGE

Abstract: Source: JP52070565A **Machine translation:** The invention described in claim 1 [Source: circumference to cut down on the number of [9] (8) The Japan Patent Office Patent application JP-a 5z-705650-phase a 52.(1977)6.11, office Docket No. name of the invention described herein 1 sewage purification method and processing apparatus 2 in the tank, the scope of the appended claims, the conductive particles 1 a predetermined amount together with the housing the electrode member is disposed through the conductive particles in the tank, the energization, yet to be processed for the conductive particle layer buried in the liquid layer sufficiently on the upper surface thereof and a predetermined so as to form a tank was charged from the bottom of the conditions in the, blowing a gas, the blowing bubbles due to gas passes through the conductive particle layer, the conductive particles by a layer between the electrodes of the soil layer portion, of the conductive particles in order to obtain to obtain the floating rotating, characterized in that it occupies the sewage purification method. 2, passing a direct current between the electrode members, the upper portion of the conductive particle layer floating, to form boundary vicinity abnormal voltage rise by energization of a relatively low voltage region, the abnormal voltage rise, characterized in that to achieve the decomposition of impurities claims sewage purification ? range. The method of claim 1, . 3, the processing tank is taken out from the flock of the impurity which is introduced into the high liquid separation tank to re-precipitate and the precipitate flock floating flocs cause residual liquid thereby separating the straw to the min. treatment tank sewage activation impurity introduced together with circulating process claims, characterized in that it force method of claim 1, 04, the sewage wastewater treatment tank for processing by housing the electrode connected to

the power supply member is disposed, the electrode member on the peripheral side of the conductive particles so as to fill the above-mentioned tank was charged to the bottom of the treated water, outlet, provided with a aeration tube to be processed thereon, sewage inlet pipe inlet tube to the upper side of the mounting, yet the electrically conductive particles on the layer surface, be adopted a predetermined height by overflow one method in order to take out the separated impurities formed by providing the outlet of the sewage purification treatment apparatus 5, the upper end portion of the electrode member of the conductive particle layer, the upper surface in calm state set the appropriate Endpage:1 be to protrude, along with the ask each electrode member in the direction of the peripheral side of the anode and the cathode as much as possible so as to be located alternately at its upper end from the tank bottom of the diffuser tube connected, blowing a gas in the upper portion of the conductive particle layer each conductive particles in a state where the rotation of the respective electrode members working to abnormal voltage rise at the middle portion of the region to form a lower part from the abnormal voltage rise, the voltage range, achieving a reduction of the voltage drop between the portion and the abnormal voltage rise of static electricity in the overall effect as charging material set so as to occupy the scope of the appended claims. 4K Sewage treatment apparatus of claim 6, the electrode member is disposed in the tank the top and bottom of the tank, perforated by a support member maintaining a predetermined distance, the bottom support member supported so as to perforation of the relatively diameter as smaller than the bottom support member which is substantially fixed at the bottom of the conductive particles of the filling layer, the upper support member of the conductive particles than the perforation of the diffuser tube may pass through the blowing gas provided with the increase due to the air bubbles upper support member of the conductive particles is lower than its upper side so as to be floating the scope of the appended claims sewage treatment apparatus of claim 4, Z sewage to be processed to the electrode member serving as the inlet pipe provided on the upper portion of the electric field distribution ?? straight, the inlet pipe is introduced into the tank by the lower portion of the electrode member with respect to the sewage that has been degraded in the distribution ?? bubble is caused to increase with increasing the active material achieving ionization miscibility flocculation of the impurities in the wastewater separated so as to reduce the scope of the appended claims. of claim 4, 8, the outlet of the processing tank, separation tank connected to the separation tank to precipitate the flocs floc floating concentrate tank the concentrated tank separation tank along with connecting the intermediate portion of the return pipe return pipe path connecting the path of the pre-treatment tank stirring tank the scope of the appended claims sewage purification treatment apparatus of claim 4, 9 condensate number group of the processing tank, the processing tank by Retsu? the both connected to the outlet of the drain separation tank, also the drain from the concentrate tank precipitate flocs feed pipe is connected to both the scope of the appended claims sewage purification treatment apparatus of claim 7, 3,

Classifications:
International (IPC 8-9): C02F1/48 (Advanced/Invention);
C02F1/48 (Core/Invention)
International (IPC 1-7): C02C1/26 C02C5/00



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Inventor(s): (std) MUGII HIROSHI

7) Family number: 6456857 (SU899487T) © PatBase

Title: PORTABLE EFFLUENT PURIFICATION PLANT

Abstract: Source: SU899487T **Machine translation:** 1 Invention relates to wastewater treatment and can be used for carrying out research on the choice of method for treating industrial wastewater, as well as to their local treatment. known portable installation comprising aeration chamber, a sump for the deposition of sludge floating skimmer oborudovanny and chlorination chamber T 1 1. However, such setting allows only lead nebolshih.kolichestv biological treatment of wastewater. known mobile installation for purifying wastewater is as a portable movable guide chamber in which is placed a reservoir for the biological purification of wastewater to the reactor subsequent clarification provided with means for introducing and mixing of aluminum sulphate, a separator for separation of particles and water osazhdayuschihs and disposed beneath the hopper to collect the precipitate. Such constructive scheme from the previous allows to extend the range of treated waste water due to the presence therein means providing cleaning reagent 21 However, studies on mobile unit assume constant H10 ing shift cleaning liquid. Thus microorganisms adaptirovavshies m to contamination of one production effluents must perestraivats consumption wastewater contaminants another 15 production, which is a lengthy process Furthermore, there are categories of waste water, for biological purification which is generally an irrational 0} for example sewage plants some surfactants, polymers, etc. Reliability of the systems described in research on industrial effluents ochistuKS not sufficient. The purpose of the invention - improving the reliability of the unit. This goal is achieved in that the apparatus further comprises

an electrolytic cell with replaceable electrode sections and associated autonomous power source unit for detecting the degree of cleaning fluid and connected to a septic tank and electrolyzer comprising sensor pH meter and switch the optical density; a reactor associated with the sump by partitions mounted movably in the direction of vertex cally. In addition, the sump is connected to the cell via a three-way electromagnetic advizhku and edges, and the camera is equipped with a fan, interlocked with the power source electric trolizera. Installation allows explore reagent purification method, electrochemical (in the presence of soluble and insoluble electrodes), and the combined method of cleaning - electric trohimichesky with pre-treatment reagent drains Figure 1 shows the setup, the general form of a longitudinal section; Figure 2 is a cross-sectional view; Fig. 3 a flow diagram of Fig. 4 reactor and the settler section; Fig. electrolyser incision. Installation 1 comprises a camera mounted on a chassis arranged in the reactor 2 and its sump 3, the electrolytic cell unit 5 for re registration purity liquid comprising a sensor, a pH meter and an optical density signal of congestion. Feed liquid to be purified is effected by means of the submersible pump 6 and the supply pipe 7. Reactor 2 Sleep female dispenser 8, a stirrer 9 and a hopper 10 to collect the precipitate "Above the hopper 10 is laid perforated kite evik 11 connected to a source of compressed air. 6 for controlling the pump on a movable wall of the reactor 2 is located level gauges 12. Reactor 2 is connected to a sump 13 by partitions 3 and 1 (Fig. adapted to have vertical movement in opposite south directions. 3 settler bottom 74 is in the form 15 for unkera collecting the precipitate. Otsroyik 3 is provided with a siphon 16 for podderani constant liquid level in the sump eaktore 2 and 3. Downstream sump 3 is provided a three-way wounds 17 binding discharging truborovod 18 disposed thereon attachment 5, and the conduit 19 supplying the cleaned water from the sump through the electromagnetic valve 3 20 4 electrolyzer. electrolyzer Inside the case (Figure 5) is located at least three replaceable electrode sections 21 connected to independent power source, which is carried out as a variable and a constant current or simultaneous supply One AC section and a DC - to another. electroflotation To recover the products in the upper part of the electrolyzer device k situated pnevmacheskoe penopriemnik 22 and 23, and to remove the bottom osazhdayuschihs elektrokoagul tion products in lower portion of the hopper is placed 2k. The feeder. a cleaning fluid electrolyzer provided with two fittings 25 and 26 positioned at the top and bottom respectively. The electrolytic cell is provided with a device 27 for outputting purified liquid and maintaining the water level in the electrolytic penopriemnika below the lower edge 23 is 10 mm. Prispoblenie 27 allows withdrawal of the purified liquid from both the top of the cell, and from the bottom. In the first case - in the nozzle 28, the second - via the connection 29. Reset is performed on the purified liquid conduit 30 (Fig. 3). If necessary, part of the purified fluid may be recycled to reactor 2 via line 31 connected to the conduit 30. A fan 32 is placed in the electrolysis zone, and k is connected to the power supply the electrolyzer. The device operates as follows. When studying the method of reagent industrial waste water from the receiving tank submersible pump 6 controlled by a level gauges 12 are fed through line 7 into the reactor 2; is concurrently supplied from the feeder 8 reagent and where transition occurs from the mixing of its drain using a metal stirrer 9 or compressed air through a perforated coil 11. cross reacting to the proce cleaning fluid with the reagent or the reaction products float on the surface, or deposited on the bottom are given, V the first case plate 13 is moved to its upper position and lowered with the partition 1 at the bottom. Liquid is withdrawn from reactor 2 pe bottom falls into the space formed by the partitions 13 and 14 and overflow through the upper edge Referring septum is supplied from above to the sump 3. Second case, when the deposition of reaction products plate 13 occupies a lower positive voltage, and plate 14 - upper. Fluid is taken from the top of reactor 2, and enters the bottom of the sump 3. After passing sump 3, spaced louse with liquid through the siphon 1b and three-way valve 17 and outlet conduit 18 to present diverted into the sewer through the device 5, a recording pH and optical density. In the study of the combined method, and an electrochemical reactant comprising cleaning fluid from the sump 3 through line 19 passes through the three-way valve 17 and the electromagnetic valve 4 into the electrolytic cell 20 through the nozzle 26 (if recoverable contaminants having a density greater than 1, or through the sleeve 25 (if contamination have a density of less than)). treated effluent is discharged through the nozzle, respectively, 28 or 29 through the fitting t Food electrode section 21 is performed as a variable and a constant current through the actuators P and P, respectively, depending on the research problem. During electrolysis, for example, in the presence of Soluble electrodes, dissolution occurs and the transition metal anode into the solution of the metal ions that neutralize the charge of colloidal particles alter the structure of the electric double layer on the surface of the particles and promote their coagulation. precipitate is seated on a bottom, collect in the hopper 24 where it is periodically removed a. supernatants products electroflotation. accumulated in a free suit up Paraty, when the bed height of 200 mm, pneumatic devices are reset 22 through the receiver 23 in a special container 33 (. Fig 3). Treated waste water outlet line 30 through the present device 5 is a recording level of treatment are directed into the sewer. In the purification process of the reagent coagulant can be prepared electrochemically in an electrolytic cell 4, wherein the coagulant is fed via conduit 31 to reactor 2. Gases released during propelling the electrolyzer are removed by a fan 32. If during the purification of the incoming wastewater izmenits concentration of contaminants or the pH value, the device 5 is installed at the outlet of purified waste water and comprising a sensor of the pH meter and absorbance detectors, responds to this change, and depending on its nature will signal or a spout 8 for changing the dose of the reagent, or by electromagnetic valve 20 for varying the feed rate of waste into or on v1pr mitelny unit 34 (fig.Z) for changing the current density at the electrode sections on the use of the invention will greatly improve the efficiency of scientific research to develop new methods of wastewater treatment, reduce the time development, and strengthen the culture of production. Sozdonie automated front-i-con izhnoy anovki Methods for the study of sewage treatment plants directly on the differences This entity where they are formed, to test approx poluproizvodstvenym conditions m and reduce The expenses associated with the determination of process parameters opimalnyh develop recommendations for proktirovani costly development proyshlennyh installations 55-60.;. Claims 1. Mobile installation for purification and wastewater comprising) camera and azmeschennye inside pump re789 actor with dispenser and agitator, sump sludge hoppers for receiving and piping system with isolation valves, characterized by the fact that in order to increase the reliability of the installation, it furthermore comprises removable electrolytic electrode sections connected thereto and autonomous power sources, power reception unit for cleaning liquid is connected with the sump and the electrolysis and comprising a sensor and alarm rNmetra optical density, while the reactor is coupled with using septic tank baffles 78 mounted movably in the vertical direction. 2. Apparatus of about l ton ide h and u and that the sump is connected to the electrolyser and the electromagnetic three-way cock valve, and the chamber is provided with a fan interlocked with the power source electrolytic sources of information received note in the examination 1. U.S. Patent ?, cl 210-195, 1973. 2. French Patent ?, cl. With 02 with VOO, 1973. -8 V 12 and 3 < f arr / ffty fj if SG ft e / ufuiffuff Jrtfjr J Compressed So3dyy: g

Classifications:

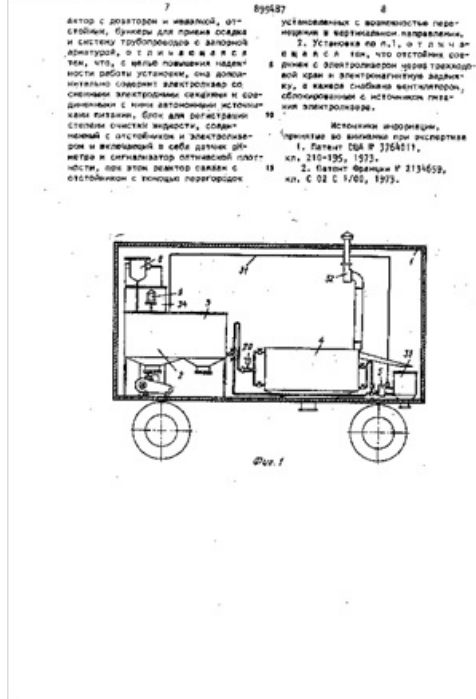
International (IPC 8-9): C02F1/46 G05D27/00 (Advanced/Invention);

G05D27/00 (Advanced/Non-invention);

C02F1/46 G05D27/00 (Core/Invention);

G05D27/00 (Core/Non-invention)

International (IPC 1-7): C02F1/46 G05D27/00

**Family:**

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