MAGNETIC SEPARATING MEANS
- Electromagnet
- And electric field separation apparatus

APPARATUS FOR SELECTIVE DIFFUSION OF GASES (E.G., SEMIPERMEABLE MEMBRANE, ETC.)
- Immobilized liquid membrane
- Membrane to degasify liquid
- Plural separate barriers
- Parallel hollow fibers or cylinders (e.g., bundled, etc.)
- Barriers connected in series
- Hollow fiber or cylinder
- Plural layers (e.g., laminated barrier, etc.)
- Organic compound containing layer
- Ring containing organic compound
- Membrane having ring containing organic compound

ELECTRIC FIELD SEPARATION APPARATUS (E.G., ELECTRICAL PRECIPITATOR, ELECTROSTATIC TYPE, ETC.)
- And radioactive or ultraviolet light ionizer
- Electric charge produced by friction (e.g., by gas flow, etc.)
- With control means responsive to sensed condition
- Concentration or temperature sensing means
- Arc, spark, or flashover sensing means
- Current sensing means
- Voltage sensing means
- Voltage sensing means
- With programmed, cyclic, or time responsive control means
- With indicating, signal, or alarm means
- With means to add charged solid or liquid particles to gaseous fluid mixture
- Electrode cleaner, apparatus part flusher, discharger, or wet collector (e.g., wet film electrode, etc.)
- Electrode or part thereof moved on or against another
- With shutdown or voltage adjustment means interrelated with cleaning (e.g., cutting off flow of gaseous fluid mixture or electrical current, etc.)
- Sequential operation
- Vibrating, jarring, or rapping means
- Mounted on rotatable shaft (e.g., swinging arm or hammer, etc.)
- Having reciprocating rod or piston type activating or rapping means
- Activated by second swinging or rotatable means
- Magnet or solenoid activating means
- Reciprocating rod or piston type activating or rapping means
- Horizontal striking means
- Movably mounted electrode
- Nonliquid contact cleaning means
- Liquid bath for immersion of electrode
- Endless belt carried or belt type electrode
- Fluid contacting means (e.g., suction means, etc.)
- Liquid applying means for electrode (e.g., projection type, etc.)
- Weir or overflow wet film type
- Having movable spraying means for liquid
- Including means to recirculate liquid
- Including baffle for directing gas flow
- Cylindrical electrode
- Apparatus purging or flushing means using gas or liquid
- Electrode scraping, brushing, or wiping means
- With means for vapor or liquid contact (e.g., for gas separation, cooling, conditioning, etc.)
CLASS 96 GAS SEPARATION: APPARATUS

53 ..Liquid spray means 78 ...Adjacent parallel collector electrodes are differently charged
54 .Having alternating electrostatic field 79 ....Collecting electrodes are flat plates
55 .And serially arranged 80 .With details of voltage supply means or circuitry
56 nonelectrical separator 81 .Closure interlock or removable section
57 ..Bypass or modification of flow 82 .Separator is single porous filter
58 of gaseous fluid mixture to 83 .Precedent nonelectrical separator
second stage 84 .Separator is single porous filter
59 ..Precedent nonelectrical 85 .Bypass or modification of flow of gaseous fluid mixture to second stage
separator 86 ..Precedent nonelectrical separator
60 .Including gas flow distribution means 87 ...Separator is single porous filter
61 ..Spiralling inflow, centrifugal, 88 .Total flow of gaseous fluid mixture through porous collector electrode
or whirl generating surface means 89 .Including gas flow distribution means
62 ..For contact with ionizing 90 ...Total flow of gaseous fluid mixture through interstitial or porous collector
electrode or uniform flow in 91 .Spiralling inflow, centrifugal, or whirl generating surface means
treating zone 92 .For contact with ionizing electrode or uniform flow in treating zone
63 ...Having means for driving gas 93 ...Spiralling inflow, centrifugal, or whirl generating surface means
flow (e.g., fan, blower, etc.) 94 ...Having means for driving gas flow (e.g., fan, blower, etc.)
64 ...Perforated baffle or gas 95 ...Perforated baffle or gas diffuser
diffuser 96 ...Perforated baffle or gas diffuser
65 ...Collecting electrode modifies gas flow 97 ...Perforated baffle or gas diffuser
66 ...Total flow of gaseous fluid mixture through interstitial or porous collector 98 ...Perforated baffle or gas diffuser
67 ....Zigzag running length 99 ...Perforated baffle or gas diffuser
68 ....Particle type collector 100 ...Collecting electrode details (e.g., sheet type, running length web, etc.)
69 ...Layered, laminated, or coated 101 ...Dielectric material containing or covering
70 ...Plural separate electrode members aligned in direction of gas flow 102 ...Multiple similar elements or sections (e.g., built up, etc.)
71 ...Segmented electrode 103 .With control means responsive to sensed condition
72 ...Continuous electrode with integral or attached projections 104 .With programmed, cyclic, or time responsive control means
73 ..Flow distribution means for parallel sections 105 .Plural separate and distinct stages
74 .With nonelectrical gas treating or conditioning means 106 .Including injection system or inlet fluid distributor
75 .Plural diverse electric fields 107 .Having system connector or coupling
76 ..One or more electrodes common to plural fields
Having imbedded baffle or flow distributor.

**SOLID SORBENT APPARATUS**

With control means responsive to sensed condition.

Fluid flow sensing means.

Concentration sensing means.

Temperature sensing means.

Pressure sensing means.

And programmed, cyclic, or time responsive control means.

With programmed, cyclic, or time responsive control means.

Regulating or metering means.

Indicating, signal, or alarm means.

With indicating means (e.g., color change indicator, etc.).

Soluble or deliquescent type (e.g., calcium chloride, etc.).

Supported by holder with drip openings.

Including liquid contacting means.

Plural solid sorbent beds.

With recovery or separation means for desorbing fluid.

Movable solid sorbent bed (e.g., fluidized bed, etc.).

With rotating gas distributor.

Rotating solid sorbent bed.

With heat exchange means.

And means for driving gas flow (e.g., pump, blower, compressor, etc.).

Compressor.

Zigzag arrangement of flat solid sorbent beds for parallel flow.

With means for regenerating solid sorbent.

Serial.

Diverse type.

Plural canisters.

Plural diverse separating means.

At least one a dispersed or impregnated solid sorbent bed.

Plural housings or casings for separating components.

With means to compress or compact solid sorbent bed.

Including means to access or replace solid sorbent.

Including baffle for modifying gas flow (e.g., flow vanes, diffuser, etc.).

And means for driving gas flow.

And means regenerating solid sorbent.

With means for driving gas flow.

With means regenerating solid sorbent.

Gas contacting means.

Means applies steam to solid sorbent.

Heat exchanger to regenerate.

Having mountable casing.

Storage or food receptacle.

With means to compress or compact solid sorbent bed.

Movable solid sorbent bed (e.g., fluidized bed, etc.).

Including means to access or replace solid sorbent.

Including baffle for modifying gas flow (e.g., imbedded in solid sorbent, etc.).

Dispersed or impregnated solid sorbent bed.

Layered or laminated (e.g., solid sorbent on support material, etc.).

**DEGASIFYING MEANS FOR LIQUID**

With control means responsive to sensed condition.

With liquid level sensing means.

Separator inlet or outlet valve responsive to float level.

Plural floats.

And temperature sensing means.

And pressure sensing means.

Plural float-controlled valves.

At least one is gas outlet valve.

And pressure sensing means.

Gas outlet valve responsive to float level.

And pressure sensing means.

Centrifugal separating means.

Liquid outlet valve responsive to float level.

And pressure sensing means.

And recycle means (e.g., for degasified liquid, etc.).
....And tangential flow or centrifugal separating means
With pressure sensing means
With temperature sensing means
With pressure sensing means
Sonic means (i.e., using sound waves)
Defoaming means
Centrifugal or rotating separator
...Having flow-through foam restrictor or eliminator (e.g., screen, etc.)
...Having flow-through foam restrictor or eliminator (e.g., screen, etc.)
...Having recycle means (e.g., for foam or separated liquid, etc.)
And liquid contact means
With separator for multiple liquids
Reservoir with three or more outlets, each for different fluid
Horizontal reservoir
...With heat exchange means
...And internal filter or screen (e.g., coalescer, etc.)
Tank or tank part movably mounted on support (e.g., for deaerating aircraft lubricating oil, etc.)
Including means to remove mist entrained in gas
.Baffle, filter, or screen
...Plural, serially arranged
...Concentric tubular members
...Alternate central and peripheral gas paths
Pressure reducing means
...And liquid flow modifier
...Centrifugal type
...Rotating means
.Baffle
...Plural baffles in series
...With heat exchange means
.Spray nozzle
...With heat exchange means
...With gas contacting means
.Spray nozzle
.Liquid flow slinger, spreader, deflector, disperser, or rotation modifier
..And preliminary heat exchange means
..At inlet to separator
...Plural, serially arranged
...Centrifugal type
...Including tangential outlet
...Split or plural inlets
...Including inner and outer casings or plural compartments
...Tangential outlet
...Rotating means
...Centrifugal type
...Impeller or screw on rotating shaft
...Heat exchanger to degasify
...And fluid filter
...Including baffle
COLD WALL-HOT WALL THERMAL DIFFUSION-TYPE SEPARATOR WITH MEANS TO ADD FRAGRANCE OR SCENT
WITH STERILIZING MEANS
.Germicidal lamp (e.g., ultraviolet light, etc.)
.Heater (e.g., electrical, steam, etc.)
.Means uses chemical antimicrobial agent
...Liquid agent
WITH MEANS USING LIQUID TO CLEAN SEPARATING APPARATUS
.Movably mounted cleaning liquid distributor
.Movable separating media
..Immersion cleaning
.Parallel vanes or baffles
.Filter
GAS AND LIQUID CONTACT APPARATUS FOR GAS SEPARATION INCLUDING MEANS TO REGENERATE, PURIFY, OR SEPARATE CONTACT LIQUID
.Means to add conditioning agent to contact liquid
.Gravitational separator for contact liquid
...With heavier component mechanical mover, trap, chamber, or recess in gravitational separator
...With lighter component removal means in gravitational separator
...With baffle, plate, or weir within gravitational separator to aid contact liquid regeneration, purification, or separation.

Filter for contact liquid including filter adjusting or removal means.

Heating or cooling means.

**WITH GAS AND LIQUID CONTACT APPARATUS**

With control means responsive to sensed condition.

Contact liquid level sensing means by pressure sensing means.

Valve responsive to float level.

Plural floats.

Contact liquid inlet valve responsive to float level.

Contact liquid outlet valve responsive to float level.

Temperature sensing means.

Gas flow rate sensing means.

Pressure sensing means.

Pressure sensitive diaphragm with programmed, cyclic, or time responsive control means.

Contact liquid movement by flowing gas force.

Including means varying gas flow to control saturation or dispersion.

Pivotal means.

About an end.

Axially movable means.

Conically or frustoconically shaped.

Having contact liquid level maintaining means (e.g., weir, wall openings, tubes, gates, etc.).

For portion of total gas flow.

Utilizing a valve.

Including means to control contact liquid return flow to supply or sump.

With heat exchange means.

Diverse means for adding liquid for gas and liquid contact.

Moving apparatus part for liquid contact.

And liquid bath or reservoir for contact.

...And contact liquid sprayer.

Means forming free-falling contact liquid curtain.

Means forming flowing contact liquid film on apparatus surface.

Means to apply contact liquid to solid or porous sheet or tube.

Venturi passage.

And liquid bath or reservoir for contact.

And contact liquid sprayer.

Liquid bath or reservoir for contact.

Submerged inlet for subsurface contact.

And contact liquid sprayer.

Movable mounted contact liquid distributor.

Rotatable solid disc or surface.

Partially immersed within contact liquid.

Rotation causes contact liquid to be drawn from liquid reservoir (e.g., suction, etc.).

Rotation caused by flowing contact liquid or gas.

Rotatable porous disc or surface.

Partially immersed within contact liquid.

Belt type.

Drum type.

Particulate media, shaped packing elements (e.g., Raschig rings, Berl saddles, etc.), or porous media for gas and liquid contact.

Moving.

In engine air inlet.

In fuel dispersal means (e.g., in carburetor, etc.).

Humidifier or evaporative cooler.

Gas dehydrator (e.g., glycol type, etc.).

Mesh or fabric screen, fibrous or filamentary pad, or perforated plate.

By sprayer.

Foam.
CLASS 96 GAS SEPARATION: APPARATUS

299 Parallel plate, sheet, or member
300 Downstream gas separation means (e.g., mist eliminator, etc.)
301 Fixed gas whirler or rotator for gas separation
302 Having conical baffle with apex facing upstream
303 Contact liquid applied in central gaseous flow path of concentric gaseous flow paths
304 Baffle, vane, or plate in outer gaseous flow path
305 Baffle, vane, or plate in central gaseous flow path
306 Liquid contact preceding whirler or rotator
307 Means forming free-falling contact liquid curtain
308 Means forming flowing contact liquid film on apparatus surface
309 Liquid bath or reservoir for contact
310 And downstream filter
311 Contact liquid spray
312 Within a venturi passage
313 Tangential gas inlet into whirler or rotator
314 Liquid contact within whirler or rotator
315 Means forming free-falling contact liquid curtain
316 Means forming flowing contact liquid film on apparatus surface
317 Liquid bath or reservoir for contact
318 And downstream filter
319 Contact liquid spray
320 Baffle means for producing or aiding contact liquid spray formation
321 Having tangential gaseous fluid mixture inlet
322 Means forming flowing contact liquid film on apparatus surface or free-falling contact liquid curtain for gas and liquid contact
323 Venturi type
324 Curved impingement surface
325 Impingement baffle or pan
326 Liquid flow surface perforated for gas flow therethrough
327 Imperforate film supporting surface
328 Inclined
329 Liquid bath or reservoir for contact
330 Having back pressure relief or liquid blow back trap or separator
331 Having antisplash means or means for retaining contact liquid during upset or tilt
332 With movable agitator in bath or reservoir for commingling gas and liquid
333 Nonliquid gas separator positioned above liquid bath or reservoir
334 Having means for forming contact liquid into spray or heap
335 Central downward gas inlet
336 Gas flows tangentially to liquid surface
337 Superposed filter
338 Having flow guide preventing entire filter face contact by gas flow
339 Surrounding gas flow path
340 Submerged inlet for subsurface contact
341 And separable liquid sump
342 Submerged inlet for subsurface contact
343 Multiple outlet orifices in submerged inlet
344 Perforated pipe
345 Perforated plate
346 Submerged baffle
347 Gas flows tangentially to liquid surface
348 Superposed stationary deflector
349 Flow reversal
350 Tortuous path
351 Submerged inlet for subsurface contact
352 Multiple outlet orifices in submerged inlet
353 Perforated pipe
354 Perforated plate
355 Nonliquid gas separating means downstream of liquid contact means
356 Parallel vanes or baffles
357 And diverse separating means

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CLASS 96 GAS SEPARATION: APPARATUS

358  ..Overlapping vanes or baffles
359  ..Moving centrifugal separator
360  ..Impact vane, baffle, or wall
361  ..Filter
362  ...Perforated plate
363  ...Mesh or fabric screen
364  ...Fibrous or filamentary pad
365  ..And preliminary separating means
366  .Deflector upstream of liquid contact means
367  ..Imperforate, impermeable baffle
368  ...Conical
369  ...Ribbed or corrugated
370  ...Angled or inclined
371  .Filter upstream of liquid contact means
372  INCLUDING INLET MEANS FOR DIVERSE GAS OR SOLID FOR GAS TREATMENT
373  .Solid or vaporized solid
374  .Steam is diverse gas
375  ..Added into combustion products
376  ..To effect particle removal (e.g., dust removal, etc.)
377  .And outlet for condensed vapors
378  .Downstream of separator
379  .And gas regulation for each inflowing gas
380  WITH SOUND DAMPING MEANS (I.E., NOISE ATTENUATION)
381  .Sound absorbing material
382  ..For vacuum cleaner
383  ..For internal combustion engine
384  .Sound attenuating gas flow path
385  ..Baffle in flow path
386  ...For internal combustion engine
387  ...Perforated surface
388  ...Expansion chamber
389  SONIC MEANS (I.E., USING SOUND WAVES)
390  SHELF OR EDGE TYPE
391  .Helical or spiral wound strip
392  .Parallel plates or discs
393  ..Grooved or slotted
394  ..Having fibrous filter material or porous structure
395  .Nap-like or pile-like material
396  WITH DRIPE OR ESCAPING MATERIAL, OTHER THAN SEPARATED CONSTITUENT, COLLECTOR
397  WITH CONTROL MEANS RESPONSIVE TO SENSED CONDITION FOR CONTROL OF GAS FLOW OR NONGASEOUS CONSTITUENT DISCHARGE
398  .Ejection of residue container or separating unit (e.g., filter or bag, etc.)
399  .Gas cutoff or diversion
400  .Gas pressure responsive means
401  ...And temperature responsive means
402  ...Plural gas pressure responsive means
403  ...For vacuum producing means (e.g., vacuum cleaner, etc.)
404  .Collecting bag presence responsive means
405  ..By response to accumulated separated liquids or solids
406  ..By float
407  ..Temperature or humidity responsive
408  .Regulation of separated constituent discharge
409  ..By liquid accumulation responsive float
410  ...Side discharge from reservoir
411  ...Control valve in line external to reservoir
412  ...Control valve in external bottom discharge line from reservoir
413  WITH SAMPLING MEANS
414  WITH INSPECTION MEANS
415  .Translucent
416  .Transparent
417  WITH SIGNALS, INDICATORS, MEASURING, OR TESTING MEANS
418  .Light signal
419  .Sound signal
420  .Temperature measuring means
421  .Pressure measuring means
422  .Gas flow rate measuring means
423  .Position measuring means
424  WITH TIMING OR CHANGEABLE PROGRAMMING MEANS
425  .Of cleaning mechanism for separating media
426  ...Sequential cleaning of plural separating media
427  ...Multiple bag-type filters in chamber
428  ..For control of pneumatic reverse flushing
429  .For advancing filter media

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Class 55 is an integral part of this Class (Class 96), as shown by the position of this box, and follows the schedule hierarchy of this Class, retaining all pertinent definitions and Class lines of this class.

**FOREIGN ART COLLECTIONS**

FOR 000 CLASS-RELATED FOREIGN DOCUMENTS

Any foreign patents or non-patent literature from subclasses that have been reclassified have been transferred directly to FOR Collections listed below. These Collections contain ONLY foreign patents or non-patent literature. The parenthetical references in the Collection titles refer to the abolished subclasses from which these Collections were derived.

FOR 100 COLD WALL-HOT WALL THERMAL DIFFUSION TYPE SEPARATOR (55/209)

FOR 101 WITH AUTOMATIC CONTROL MEANS FOR GAS OR NONGASEOUS CONSTITUENT DISCHARGE (55/210)

FOR 102 .Ejection of residue container or separating unit (e.g., filter or bag) (55/211)

FOR 103 .Gas cutoff or diversion (55/212)

FOR 104 .Gas pressure responsive separate reactor surface means (552/13)

FOR 105 .Bag presence responsive means (55/214)

FOR 106 .By response to accumulated separated liquids (55/215)

FOR 107 ...By float (55/216)

FOR 108 .Temperature or humidity responsive (55/217)

FOR 109 .Regulation of separated constituent discharge (55/218)

FOR 110 .By liquid accumulation responsive float (55/219)

FOR 111 WITH LIQUID CONTACTING MEANS (E.G., GAS OR MEDIA CLEANING) (55/220)

FOR 112 .With indirect heat exchange means for gas (55/222)

FOR 113 .Diverse means for contacting or applying liquid (55/223)

FOR 114 .For portion of total gas flow (55/224)

FOR 115 .Liquid control responsive to flowing gas force (55/225)

FOR 116 .With means varying gas flow to control saturation or dispersion (55/226)

FOR 117 .With treating liquid automatic control or level maintaining means (55/227)

FOR 118 .With treating liquid conditioning or separating means (55/228)

FOR 119 .With means to control liquid return flow to supply or sump (55/229)

FOR 120 .Movably mounted liquid distributor (e.g., moving nozzle) (55/230)

FOR 121 ...Distributor is gas contacting means (e.g., wet pad) (55/231)

FOR 122 ...With distributor immersing means (55/232)

FOR 123 .Liquid applied to particulate or porous media for gas contact (55/233)

FOR 124 ..Media extends into bath (55/234)

FOR 125 .With fixed gas whirler or rotator means for gas separation (55/235)

FOR 126 ...Liquid applied in central of concentric flow paths (55/236)

FOR 127 ...Liquid contact preceding or within whirler or rotator means (55/237)

FOR 128 ...Spray or film contact (55/238)

FOR 129 ..Reversal of gas flow by surface of body of liquid (55/239)

FOR 130 ..With means forming flowing liquid film or sheet for gas contact (55/240)

FOR 131 ...On impervious backing (e.g., corrugated plates) (55/241)

FOR 132 ..With liquid cleaning or flushing means for media (55/242)

FOR 133 ..Immersion cleaning (55/243)

FOR 134 ..Gas flow contacts liquid bath (55/244)
FOR 135 . .With back pressure relief or auxiliary liquid trap or baffle (55/245)
FOR 136 . .With antisplash means or means for retaining liquid during upset or tilt (55/246)
FOR 137 . .With movable means in bath for commingling gas and liquid (55/247)
FOR 138 . .Separator positioned above liquid bath (55/248)
FOR 139 . . .With means for forming liquid into a spray or heap (55/249)
FOR 140 . . .Superposed filter (55/250)
FOR 141 . . .With flow guide preventing entire leading surface contact (55/251)
FOR 142 . . .Surrounding gas flow path (55/252)
FOR 143 . . .With separable liquid sump (55/253)
FOR 144 . . .With anticreep means (55/254)
FOR 145 . . .Submerged inlet for subsurface contact of liquid (55/255)
FOR 146 . . .Submerged inlet for subsurface contact (55/256)
FOR 147 . . .Gas separating means downstream of contacting means (55/257.1)
FOR 148 . . .Parallel vanes (55/257.2)
FOR 149 . . .Overlapping vanes (55/257.3)
FOR 150 . . .Centrifugal (55/257.4)
FOR 151 . . .Impact plate (55/257.5)
FOR 152 . . .Perforated plate (55/257.6)
FOR 153 . . .Heat exchange (55/257.7)
FOR 154 . . .With preliminary separating means (55/258)
FOR 155 . . .Filter type separating means (55/259)
FOR 156 . . .With deflecting means preliminary to liquid contact (55/260)
FOR 157 . . .WITH INLET MEANS FOR DIVERSE FLUID OR SOLID FOR GAS TREATMENT (55/261)
FOR 158 . . .Solid or vaporized solid (55/262)
FOR 159 . . .Steam (55/263)
FOR 160 . . .With outlet for condensed vapors (55/264)
FOR 161 . . .Downstream of separator (55/265)
FOR 162 . . .With flow control for each inflow gas (55/266)
FOR 163 . . .WITH HEATING OR COOLING MEANS FOR GAS, OR WITH INSULATION (55/267)
FOR 164 . . .Two confined fluids in indirect contact (55/268)
FOR 165 . . .Heat exchanger is part of separator or is contiguous therewith (55/269)
FOR 166 . . .WITH SAMPLING, WEIGHTING, TESTING, OR METERING MEANS (55/270)
FOR 167 . . .WITH TIMING OR CHANGEABLE PROGRAMMING MEANS (55/271)
FOR 168 . . .Of cleaning mechanism for media (55/272)
FOR 169 . . .Sequential cleaning of plural units (55/273)
FOR 170 . . .WITH SIGNALS AND INDICATORS (E.G., INSPECTION MEANS) (55/274)
FOR 171 . . .Moisture sensitive (55/275)
FOR 172 . . .WITH SOUND DAMPING OR ACOUSTICAL MEANS (I.E., NOISE ATTENUATION) (55/276)
FOR 173 . . .SONIC TYPE (55/277)
FOR 174 . . .SHELF OR EDGE TYPE (55/278)
FOR 175 . . .WITH STERILIZING MEANS (55/279)
FOR 176 . . .WITH DRIp OR ESCAPING MATERIAL COLLECTOR (NOT OF SEPARATED CONSTITUENT AS SUCH) (55/280)