

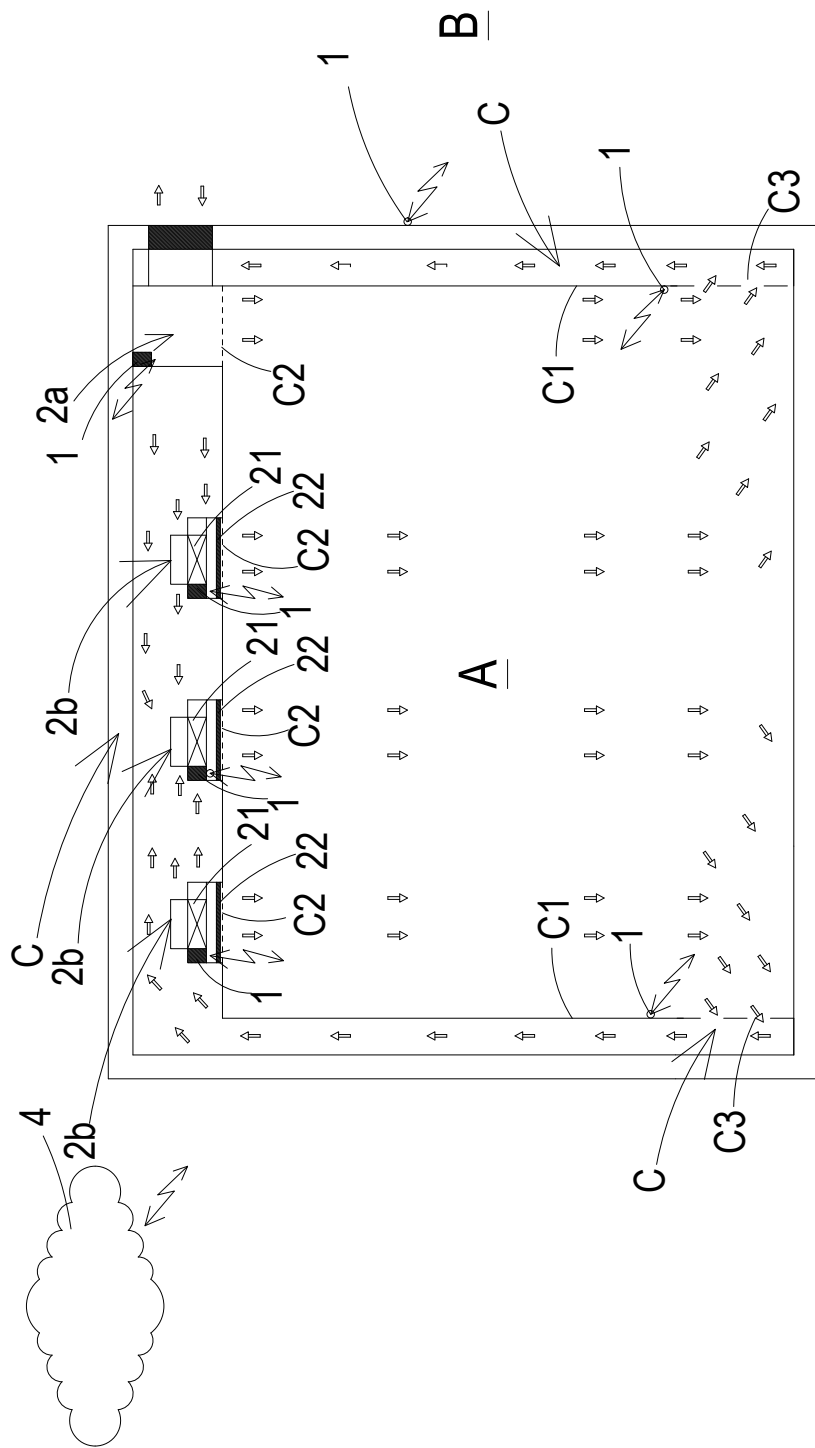


FIG. 1A

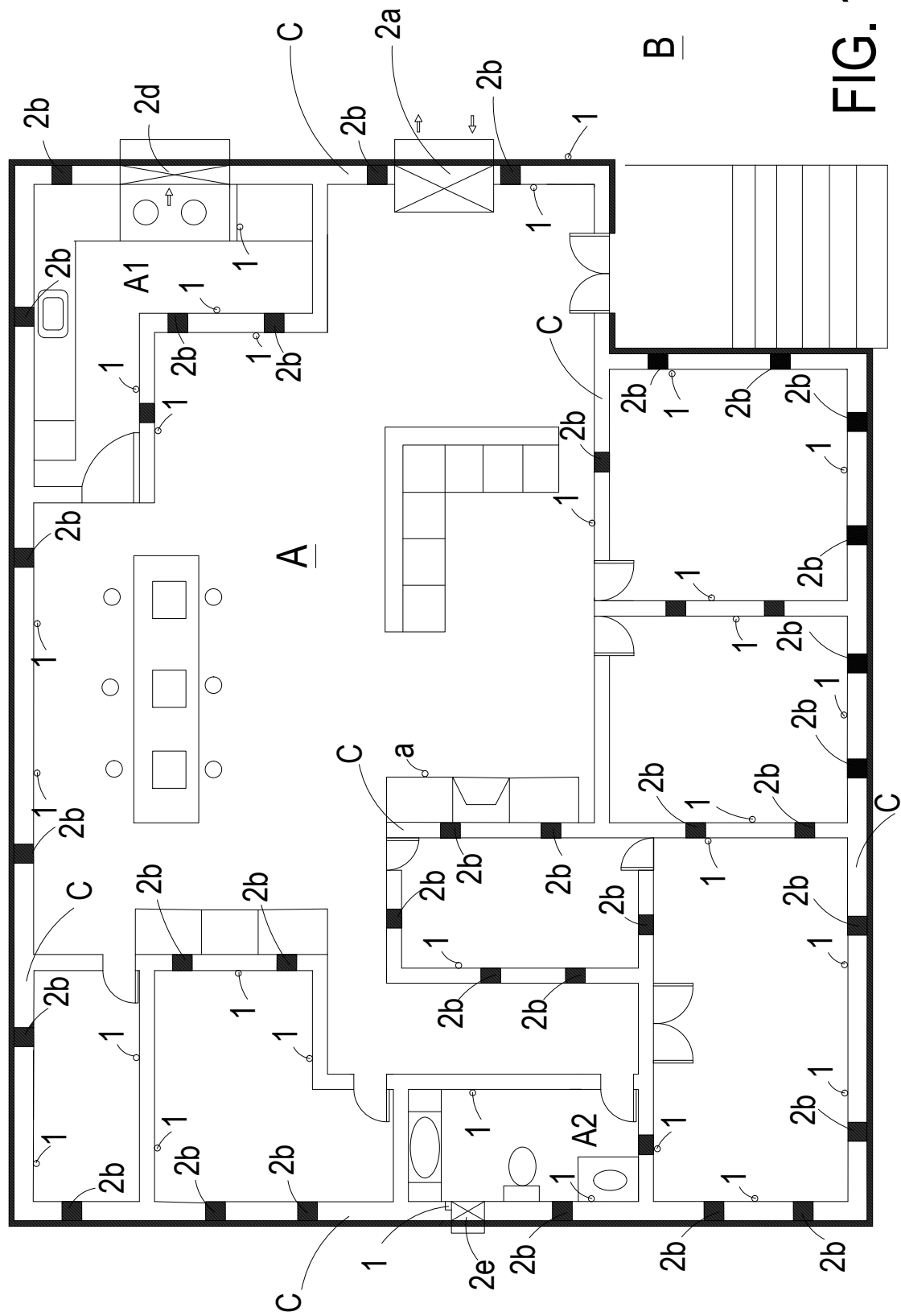


FIG. 1B

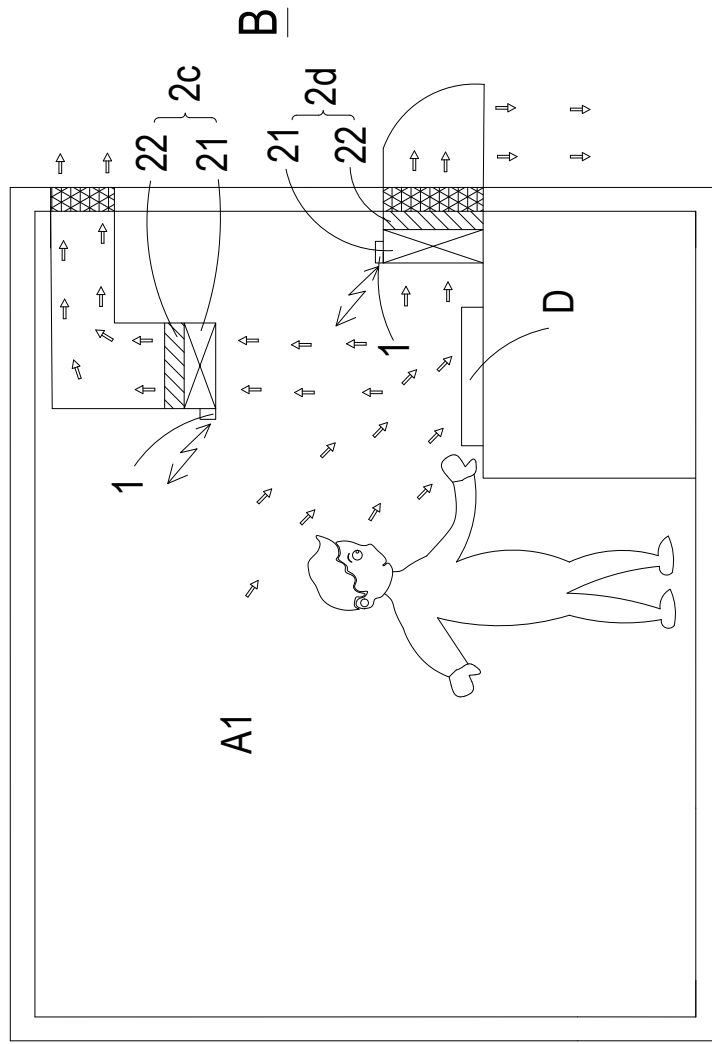
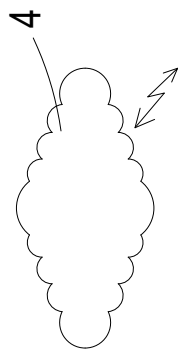


FIG. 1C

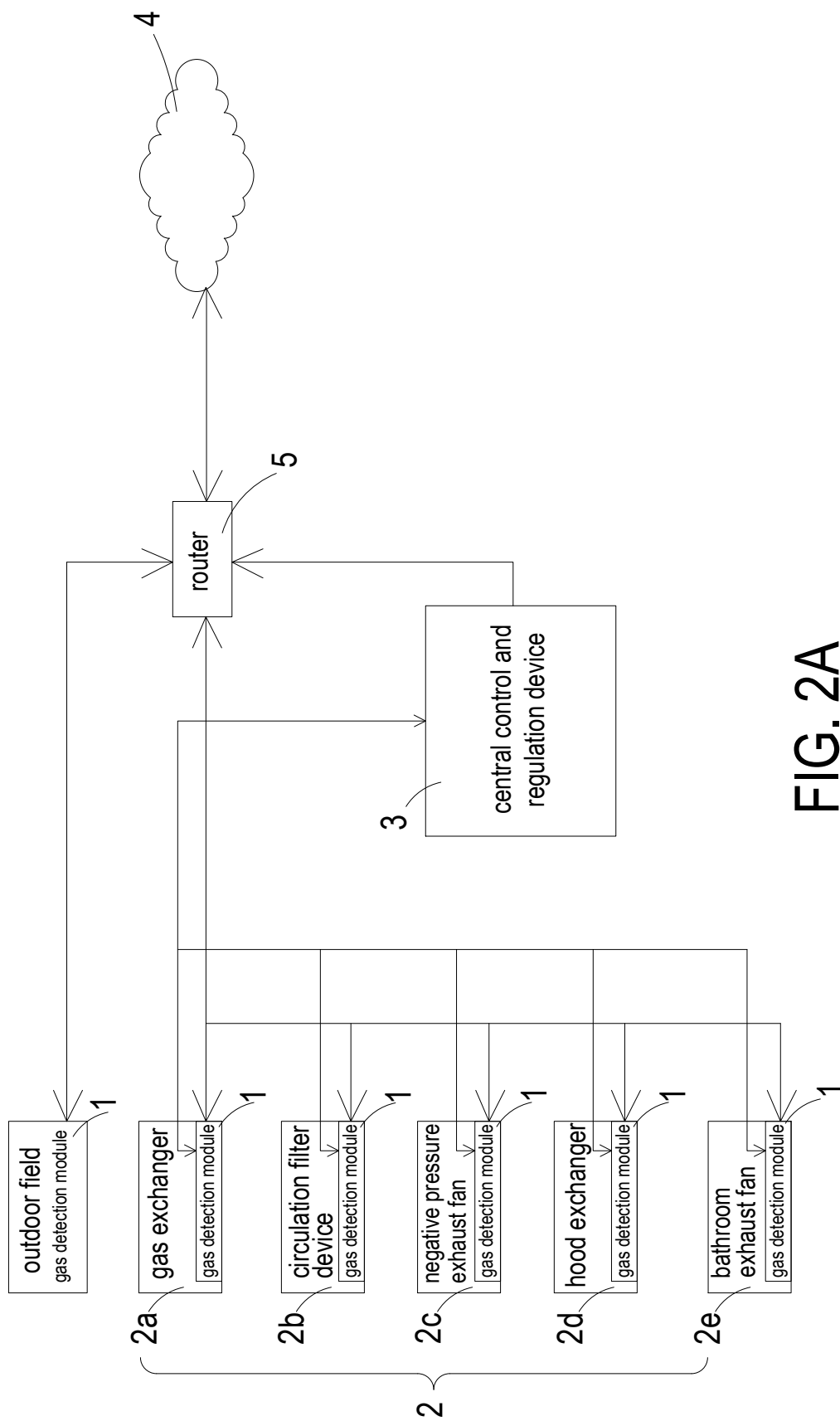


FIG. 2A

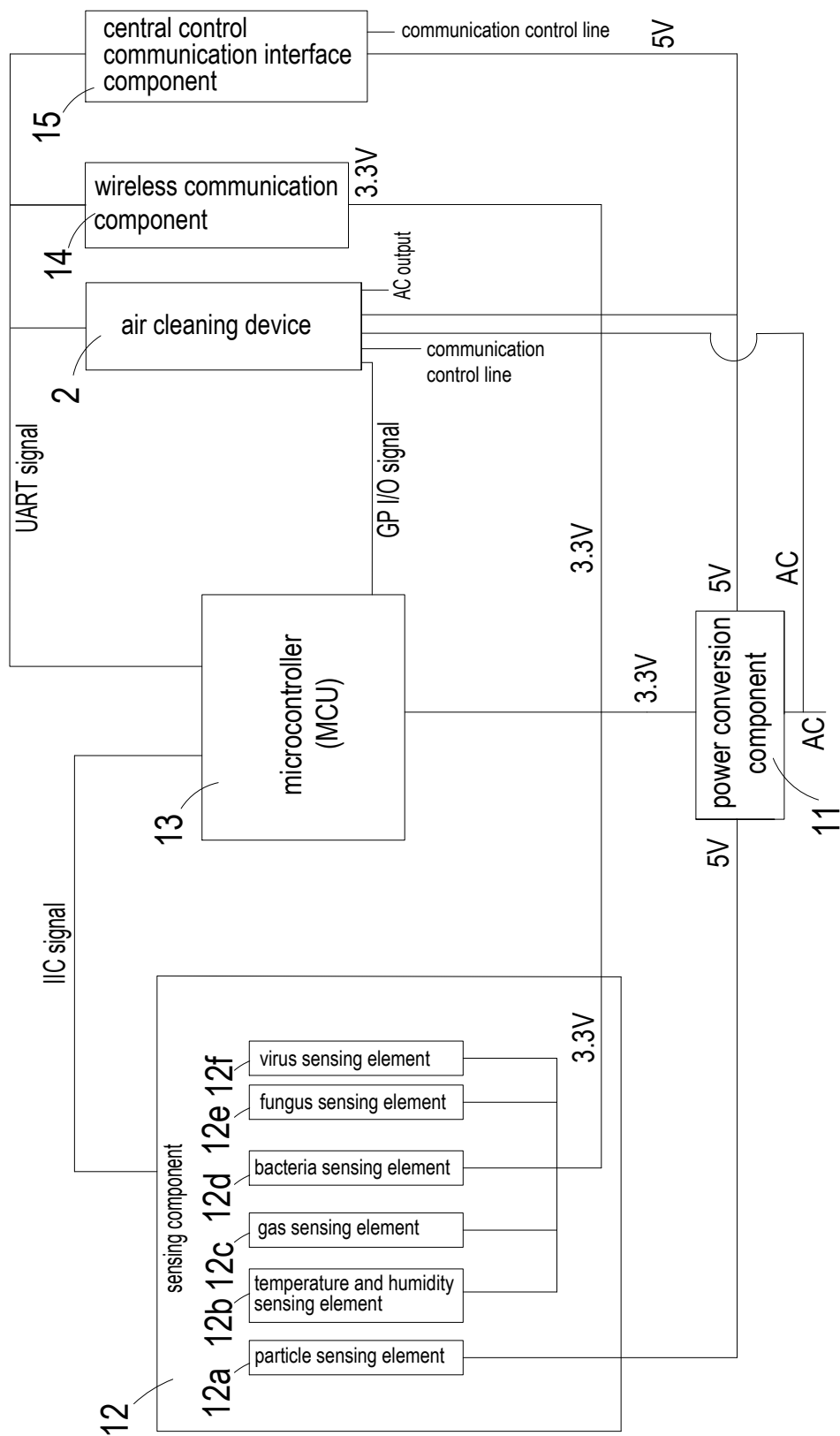


FIG. 2B

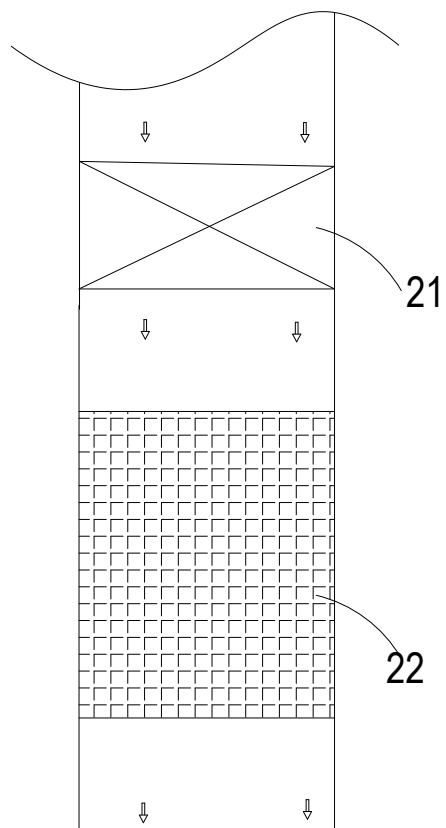


FIG. 3A

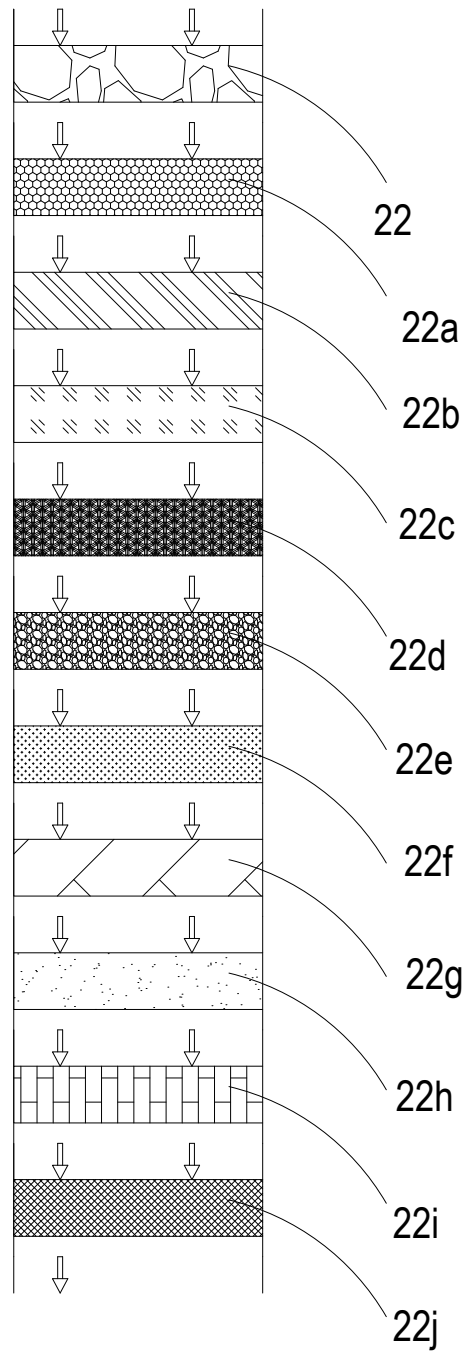


FIG. 3B

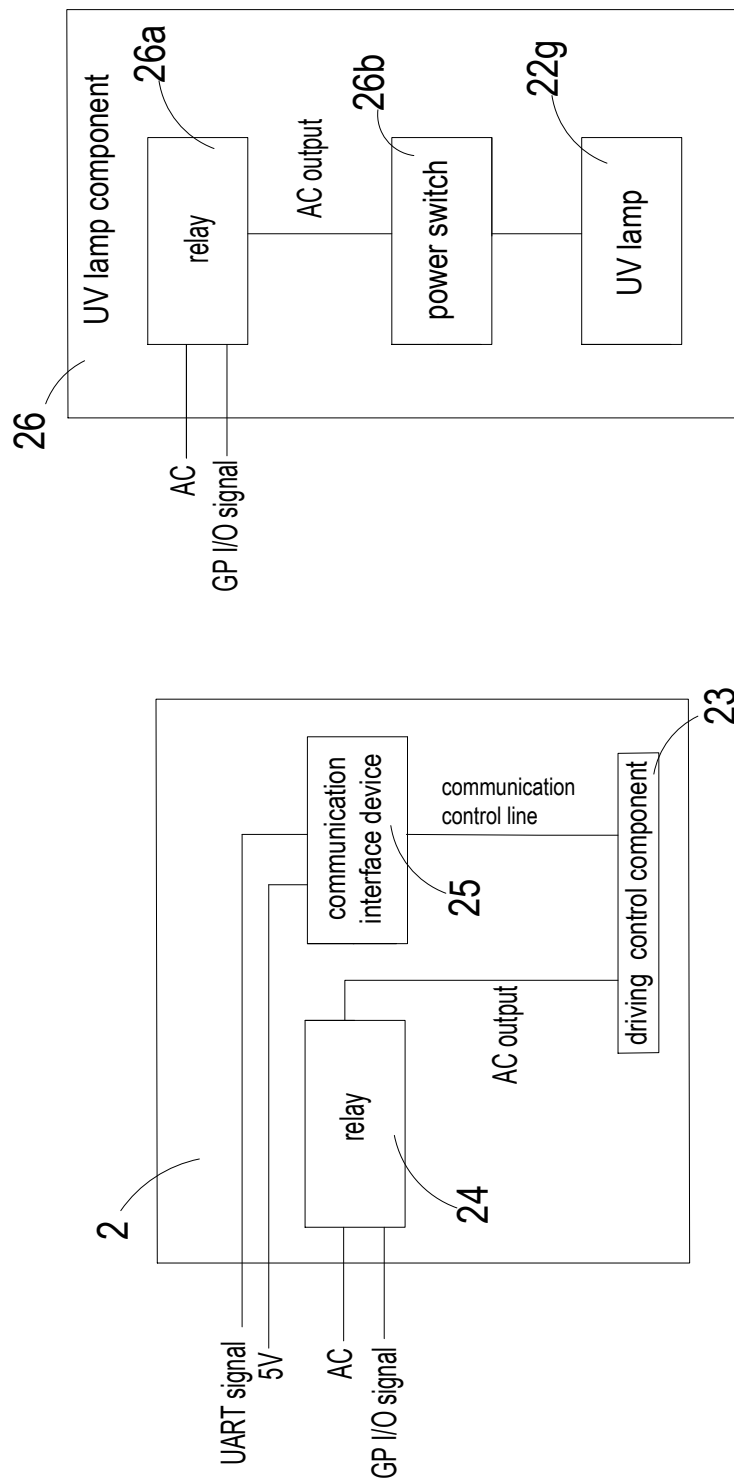


FIG. 3C

FIG. 3D



FIG. 4A

1

1 |

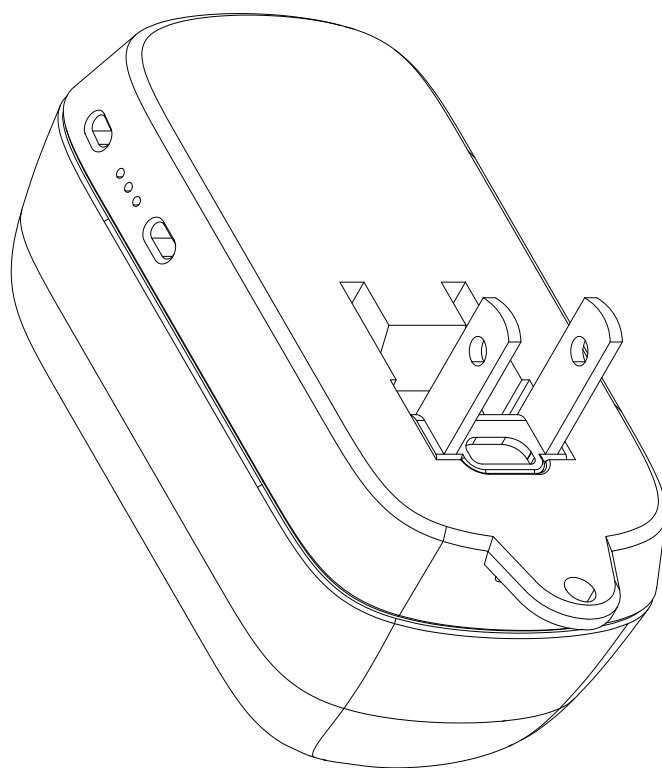


FIG. 4B

1 |

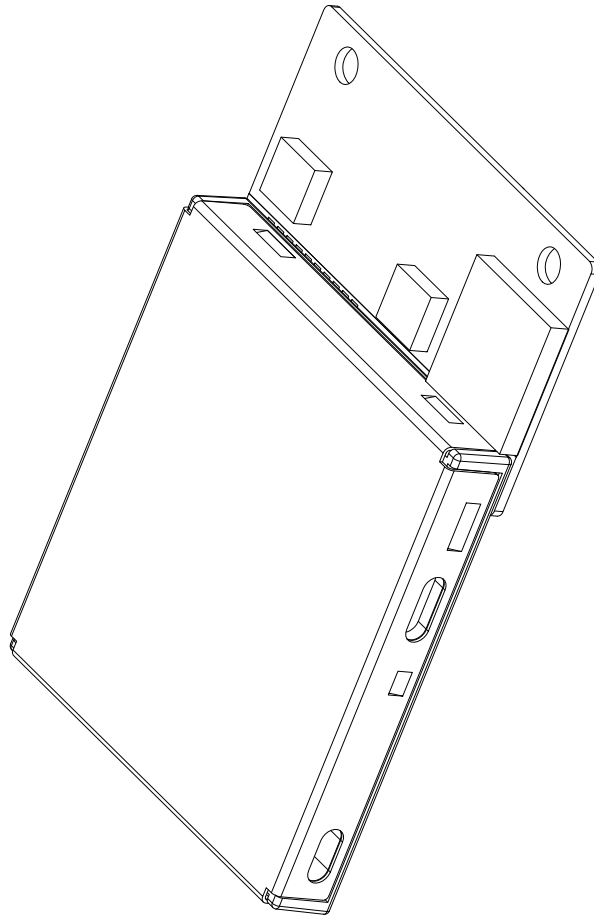


FIG. 4C

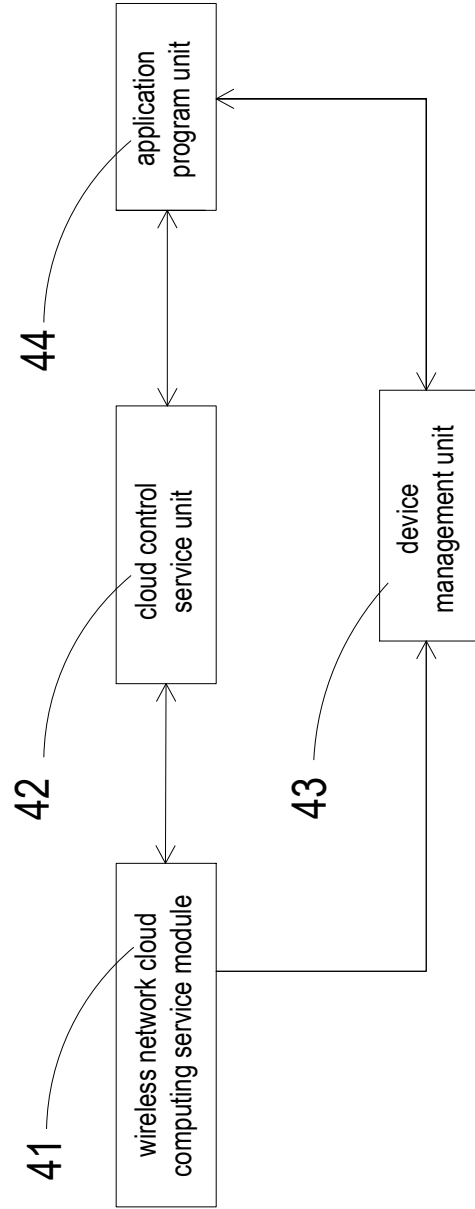


FIG. 5

clean room	level	cumulative number of PM2.5 inhaled suspended particles detected in 24 hours	required indoor field space for one air cleaning device (ping)	required indoor field space for one air cleaning device (m ²)	required indoor field space for one air cleaning device (ft ²)	bacteria number of colonies	fungus number of colonies	formaldehyde (ppm)	volatile organic compounds (TVOC) (ppm)	carbon dioxide (ppm)	carbon monoxide (ppm)	ozone (ppm)	methane (ppm)
ZAPClean room	1	500,000	0.7	2.4	25.6	2	2	0.032	0.24	800	4	0.020	9
ZAPClean room	2	1,000,000	1	3.4	36.6	5	5	0.038	0.27	800	4	0.025	10
ZAPClean room	3	2,500,000	1.5	4.9	52.3	10	10	0.044	0.30	800	5	0.030	11
ZAPClean room	4	5,000,000	2	6.9	74.7	30	30	0.05	0.33	800	5	0.035	12
ZAPClean room	5	10,000,000	3	9.9	106.8	80	60	0.056	0.37	800	6	0.040	13
ZAPClean room	6	25,000,000	5	16.5	177.9	200	150	0.062	0.41	800	7	0.045	14
ZAPClean room	7	50,000,000	7	23.6	254.2	500	350	0.068	0.45	800	7	0.050	16
ZAPClean room	8	100,000,000	10	33.7	363.1	1000	750	0.074	0.50	1000	8	0.055	18
ZAPClean room	9	200,000,000	15	48.2	518.7	1500	1000	0.08	0.56	1000	9	0.060	20

FIG. 6A

clean room	level	cumulative number of PM2.5 inhaled suspended particles detected in 24 hours	required indoor field space for one air cleaning device (ping)	required indoor field space for one air cleaning device (m ²)	required indoor field space for one air cleaning device (ft ²)	toluene (ppm)	nitric oxide (ppm)	nitrogen dioxide (ppm)	sulfur dioxide (ppm)	radon (Bq/m ³)	ammonia (ppm)	chlorine (ppm)	hydrogen cyanide (ppm)
ZAPClean room	1	500,000	0.7	2.4	25.6	43	0.043	0.043	0.032	40	9	0.43	4
ZAPClean room	2	1,000,000	1	3.4	36.6	48	0.048	0.048	0.036	45	10	0.48	5
ZAPClean room	3	2,500,000	1.5	4.9	52.3	53	0.053	0.053	0.040	51	12	0.53	5
ZAPClean room	4	5,000,000	2	6.9	74.7	59	0.059	0.059	0.044	57	14	0.59	6
ZAPClean room	5	10,000,000	3	9.9	106.8	66	0.066	0.066	0.049	64	16	0.66	7
ZAPClean room	6	25,000,000	5	16.5	177.9	73	0.073	0.073	0.055	72	18	0.73	7
ZAPClean room	7	50,000,000	7	23.6	254.2	81	0.081	0.081	0.061	81	20	0.81	8
ZAPClean room	8	100,000,000	10	33.7	363.1	90	0.090	0.090	0.068	90	23	0.90	9
ZAPClean room	9	200,000,000	15	48.2	518.7	100	0.100	0.100	0.075	100	25.0	1.00	10

FIG. 6B

clean room	level	cumulative number of PM2.5 inhaled suspended particles detected in 24 hours	required indoor field space for one air cleaning device (pling)	required indoor field space for one air cleaning device (m ²)	required indoor field space for one air cleaning device (ft ²)	hydrogen sulfide (ppm)	bromopropane (ppm)	acetaldehyde (ppm)	mercury and its compounds (ng/m ³)	dioxin (ng-TEQ/Nm ³)	acrolein (ppm)	dichloropropane (ppm)	dichloromethane (ppm)
ZAPClean room	1	500,000	0.7	2.4	25.6	4	0.04	40	0.004	0.43	0.04	30	19
ZAPClean room	2	1,000,000	1	3.4	36.6	5	0.05	45	0.005	0.48	0.05	34	22
ZAPClean room	3	2,500,000	1.5	4.9	52.3	5	0.05	51	0.005	0.53	0.05	38	25
ZAPClean room	4	5,000,000	2	6.9	74.7	6	0.06	57	0.006	0.59	0.06	43	28
ZAPClean room	5	10,000,000	3	9.9	106.8	7	0.07	64	0.007	0.66	0.07	48	32
ZAPClean room	6	25,000,000	5	16.5	177.9	7	0.07	72	0.007	0.73	0.07	54	36
ZAPClean room	7	50,000,000	7	23.6	254.2	8	0.08	81	0.008	0.81	0.08	60.75	40.5
ZAPClean room	8	100,000,000	10	33.7	363.1	9	0.09	90	0.009	0.90	0.09	67.5	45
ZAPClean room	9	200,000,000	15	48.2	518.7	10	0.1	100	0.01	1	0.1	75	50

FIG. 6C

clean room	level	cumulative number of PM2.5 inhaled suspended particles detected in 24 hours	required indoor field space for one air cleaning device (ping)	required indoor field space for one air cleaning device (m ²)	required indoor field space for one air cleaning device (ft ²)	acrylonitrile (ppm)	1,3-dichloropropene (ppm)	nickel compounds (mg/m ³)	organic arsenic compounds (ppm)	dichloroethylene (ppm)	polychlorinated biphenyls (mg/m ³)	benzene (ppm)	ethylene oxide (ppm)
ZAPClean room	1	500,000	0.7	2.4	25.6	0.86	0.43	0.43	0.22	84	0.004	0.43	0.43
ZAPClean room	2	1,000,000	1	3.4	36.6	0.96	0.48	0.48	0.24	94	0.005	0.48	0.48
ZAPClean room	3	2,500,000	1.5	4.9	52.3	1.06	0.53	0.53	0.27	105	0.005	0.53	0.53
ZAPClean room	4	5,000,000	2	6.9	74.7	1.18	0.59	0.59	0.30	117	0.006	0.59	0.59
ZAPClean room	5	10,000,000	3	9.9	106.8	1.31	0.66	0.66	0.33	130	0.007	0.66	0.66
ZAPClean room	6	25,000,000	5	16.5	177.9	1.46	0.73	0.73	0.36	145	0.007	0.73	0.73
ZAPClean room	7	50,000,000	7	23.6	254.2	1.62	0.81	0.81	0.41	162	0.008	0.81	0.81
ZAPClean room	8	100,000,000	10	33.7	363.1	1.80	0.90	0.90	0.45	180	0.009	0.90	0.90
ZAPClean room	9	200,000,000	15	48.2	518.7	2	1	1	0.5	200	0.01	1	1

FIG. 6D

clean room	level	cumulative number of suspended particles detected in 24 hours	required indoor field space for one air cleaning device (ping)	required indoor field space for one air cleaning device (m ²)	required indoor field space for one air cleaning device (ft ²)	polycyclic organic matter (ppm)	beryllium and its compounds (mg/m ³)	quinoline (ppm)	1,3-butadiene (ppm)	hexachlorobenzene (ppm)	1,1,2,2-tetrachloroethane (ppm)	cadmium and its compounds (mg/m ³)	hydrazine (ppm)
ZAPClean room	1	500,000	0.7	2.4	25.6	0.43	0.0009	0.0004	2.15	0.43	0.43	0.022	0.04
ZAPClean room	2	1,000,000	1	3.4	36.6	0.48	0.0010	0.0005	2.39	0.48	0.48	0.024	0.05
ZAPClean room	3	2,500,000	1.5	4.9	52.3	0.53	0.0011	0.0005	2.66	0.53	0.53	0.027	0.05
ZAPClean room	4	5,000,000	2	6.9	74.7	0.59	0.0012	0.0006	2.95	0.59	0.59	0.030	0.06
ZAPClean room	5	10,000,000	3	9.9	106.8	0.66	0.0013	0.0007	3.28	0.66	0.66	0.033	0.07
ZAPClean room	6	25,000,000	5	16.5	177.9	0.73	0.0015	0.0007	3.65	0.73	0.73	0.036	0.07
ZAPClean room	7	50,000,000	7	23.6	254.2	0.81	0.0016	0.0008	4.05	0.81	0.81	0.041	0.08
ZAPClean room	8	100,000,000	10	33.7	363.1	0.90	0.0018	0.0009	4.50	0.90	0.90	0.045	0.09
ZAPClean room	9	200,000,000	15	48.2	518.7	1	0.002	0.001	5	1	1	0.05	0.1

FIG. 6E

clean room	level	cumulative number of PM _{2.5} inhaled suspended particles detected in 24 hours	required indoor space for one air cleaning device (ping)	required indoor field space for one air cleaning device (m ²)	required indoor field space for one air cleaning device (ft ²)	tetrachlorethylene ppm	chloroform ppm	lead and its inorganic compounds mg/m ³	trichlorethylene ppm	chromium compounds mg/m ³	manganese and its inorganic compounds mg/m ³	vinyl chloride ppm
ZAPClean room	1	500,000	0.7	2.4	25.6	19	2	0.022	19	0.22	2.15	0.43
ZAPClean room	2	1,000,000	1	3.4	36.6	22	3	0.024	22	0.24	2.39	0.48
ZAPClean room	3	2,500,000	1.5	4.9	52.3	25	4	0.027	25	0.27	2.66	0.53
ZAPClean room	4	5,000,000	2	6.9	74.7	28	5	0.030	28	0.30	2.95	0.59
ZAPClean room	5	10,000,000	3	9.9	106.8	32	6	0.033	32	0.33	3.28	0.66
ZAPClean room	6	25,000,000	5	16.5	177.9	36	7	0.036	36	0.36	3.65	0.73
ZAPClean room	7	50,000,000	7	23.6	254.2	40.5	8.1	0.041	40.5	0.41	4.05	0.81
ZAPClean room	8	100,000,000	10	33.7	363.1	45	9	0.045	45	0.45	4.50	0.90
ZAPClean room	9	200,000,000	15	48.2	518.7	50	10	0.05	50	0.5	5	1

FIG. 6F