

SilencerCo Weapons Research, LLC v. HuxWrx Safety Co, LLC IPR2024-01214



Patent Owner's Demonstratives

U.S. Patent No. 8,286,750



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(12) **United States Patent**
Oliver

(10) **Patent No.:** US 8,286,750 B1
(45) **Date of Patent:** Oct. 16, 2012

(54) **ENERGY CAPTURE AND CONTROL DEVICE**

(75) Inventor: **Russell Oliver, Sandy, UT (US)**

(73) Assignee: **O.S.S. Holdings, LLC, Murray, UT (US)**

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **13/025,989**

(22) Filed: **Feb. 11, 2011**

Related U.S. Application Data

(60) Provisional application No. 61/303,553, filed on Feb. 11, 2010, provisional application No. 61/418,285, filed on Nov. 30, 2010.

(51) **Int. Cl.**
F41A 21/00 (2006.01)

(52) **U.S. Cl.** **181/223; 89/14.4**

(58) **Field of Classification Search** **181/223; 89/14.4**

See application file for complete search history.

References Cited

U.S. PATENT DOCUMENTS

748,157	A	12/1903	Bouton	
822,127	A	5/1906	Hufnagel	
916,885	A	3/1909	Maxim	
1,341,363	A	5/1920	Fiala	181/223
1,427,802	A	9/1922	Goodwin	
1,462,158	A	7/1923	Wildner	
1,736,319	A	11/1929	Maxim	
1,773,443	A	8/1930	Wilman	
2,514,996	A	7/1950	Faust, Jr.	
3,667,570	A	9/1972	WerBell, III	181/223
3,693,750	A	9/1972	Takkunen	
4,454,798	A	6/1984	Shea et al.	

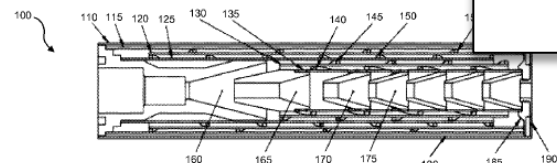
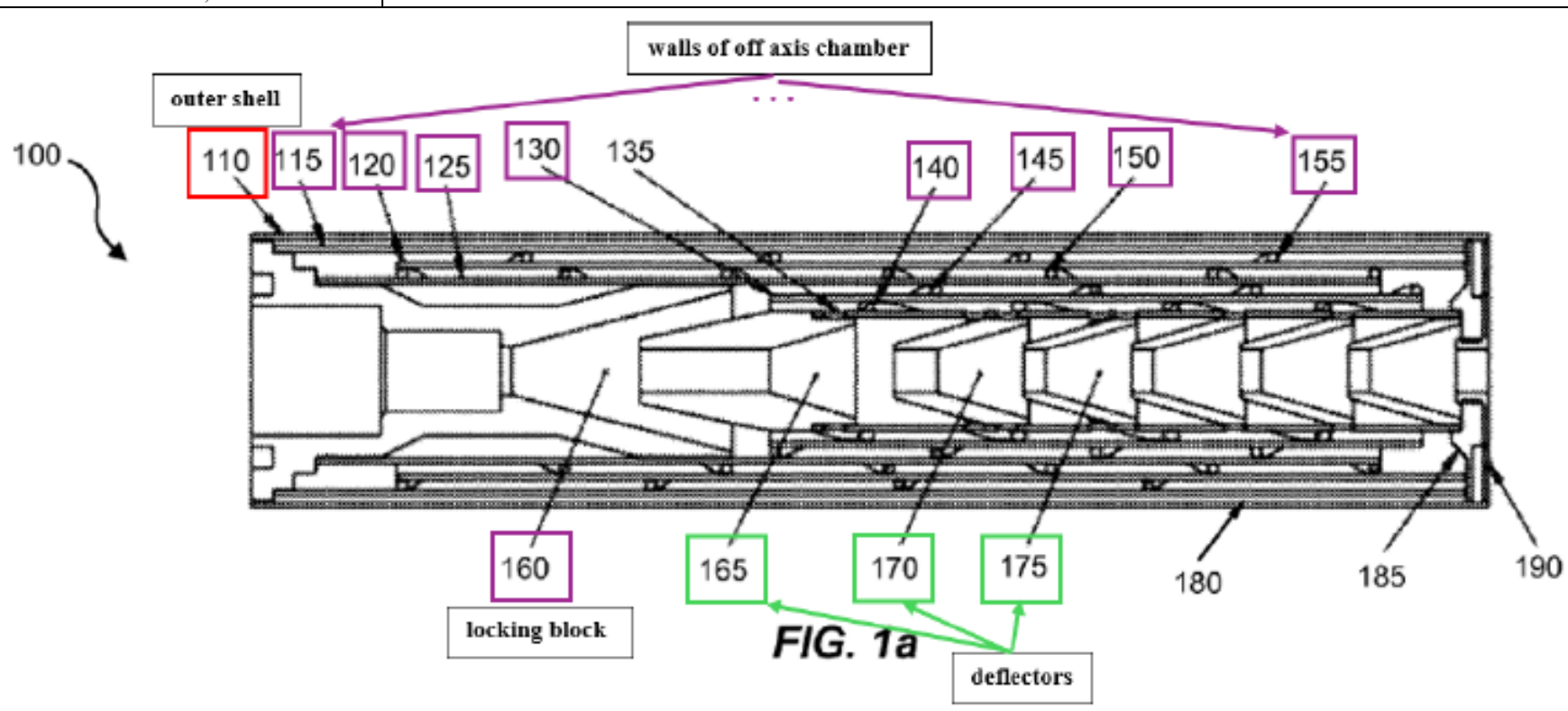
4,482.0
4,501.1
4,510.8
4,530.4
4,576.0
4,907.4
4,974.4
5,010.6
5,029.5
5,036.7
5,078.0
5,164.5

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1. An energy capture and control device, comprising:
 - a) a central chamber oriented along a central axis within an outer shell, said central chamber having an inlet configured to receive a high energy material from a high energy outlet;
 - b) a common off axis chamber oriented within the outer shell in fluid communication with the central chamber and having a fluid outlet and multiple internal walls defining a serpentine fluid pathway which is at least one of axially serpentine and radially serpentine and which dissipates energy transferred from the high energy material; and
 - c) a plurality of deflectors oriented in series along the central axis of the central chamber and configured to deflect the energy from the high energy material to the common off axis chamber.

1. *Level Of Ordinary Skill In The Art*

A person of ordinary skill in the art of the '750-Patent at the time of the alleged invention would have had a relevant technical degree in Mechanical Engineering, Fluid Engineering, or the like, and 2-3 years of experience researching, designing, manufacturing, or assessing ESDs, though less education may be sufficient with additional experience, and *vice versa*. See EX1013, VII.C.

Dr. Neitzel is a POSITA



- Ph.D. in Fluid Mechanics from Johns Hopkins University. Neitzel Decl. (Ex. 2001), ¶ 9.
- Professor of Mechanical Engineering at Georgia Tech for 28 years. Neitzel Decl. (Ex. 2001), ¶ 8.
- Worked at the U.S. Army Ballistic Research Laboratories (now known as the Army Research Laboratory) for 10 years. Neitzel Decl. (Ex. 2001), ¶¶ 9-10.
- Fellow of the Division of Fluid Dynamics of the American Physical Society and American Society of Mechanical Engineers. Neitzel Decl. (Ex. 2001), ¶ 12.

“at least one of”



“Neither courts nor the Board has interpreted *SuperGuide* as setting forth a per se rule that the use of ‘at least one of’ followed by ‘and’ necessarily connotes a conjunctive list, and both courts and the Board have found *SuperGuide* inapplicable when the listed items following ‘at least one of’ are not categories containing many possible values. See *Apple Inc. v. CPA Patent Techs. PTY, LTD.*, IPR2022-00601, Paper 31 at 28 (PTAB Sept. 27, 2023) (collecting cases).”

Institution Decision (Paper 7) at 15

“Accordingly, for the foregoing reasons and on this preliminary record, we interpret ‘at least one of’ as recited in the claims of the ‘750 patent to have its plain and ordinary meaning of one or more.”

Institution Decision (Paper 7) at 16

“a common off axis chamber”/“a plurality of deflectors...”



- No construction necessary.
- No basis to require that a “common off axis chamber” be an off-axis chamber into which at least two deflectors “separately and directly” deflect energy.
- No basis to require that the “plurality of deflectors” each be configured to deflect energy to the common off axis chamber “via respective separate and direct fluid connections.”

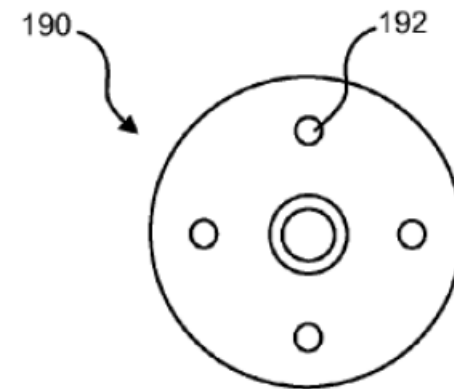
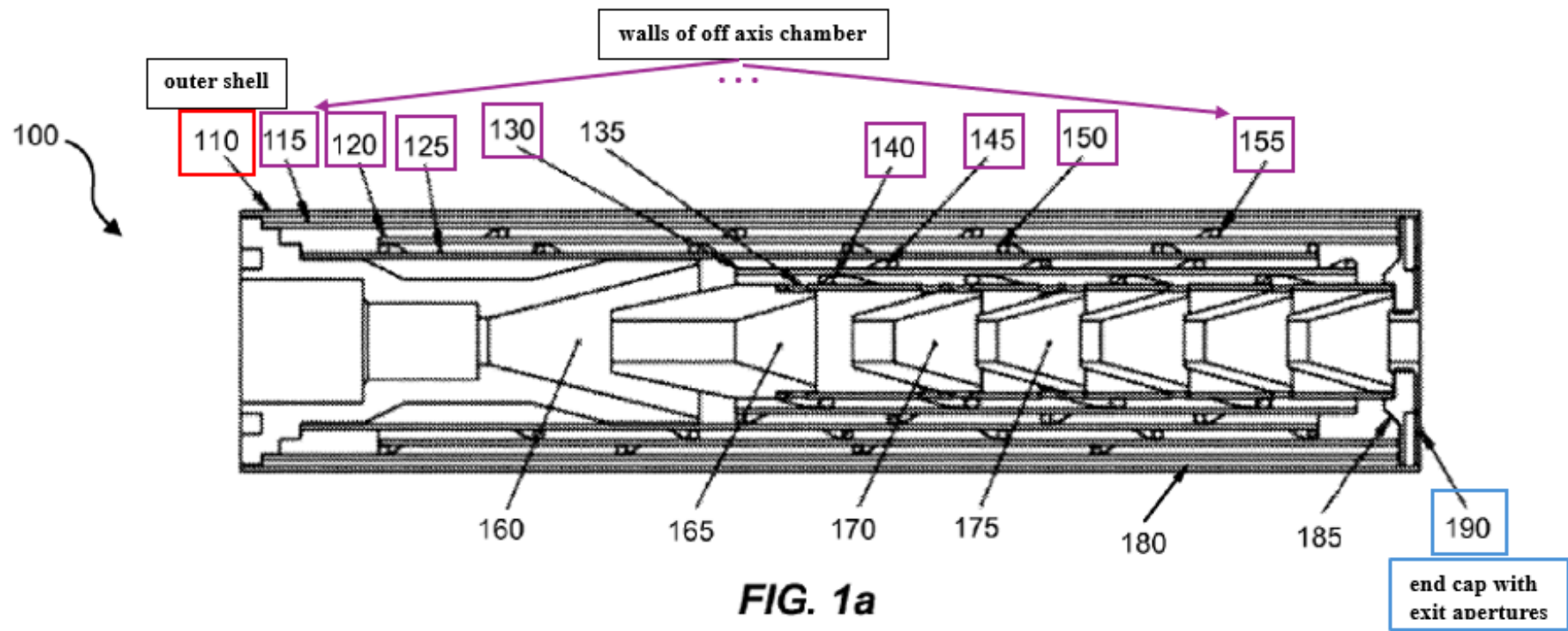
“fluid outlet” = an outlet for fluids to escape from the off axis chamber and the device without returning to the central chamber

“fluid outlet”



1. An energy capture and control device, comprising:
 - a) a central chamber oriented along a central axis within an outer shell, said central chamber having an inlet configured to receive a high energy material from a high energy outlet;
 - b) a common off axis chamber oriented within the outer shell in fluid communication with the central chamber and having a fluid outlet and multiple internal walls defining a serpentine fluid pathway which is at least one of axially serpentine and radially serpentine and which dissipates energy transferred from the high energy material; and
 - c) a plurality of deflectors oriented in series along the central axis of the central chamber and configured to deflect the energy from the high energy material to the common off axis chamber.

“fluid outlet”



Furthermore, each of the independent claims requires that the off axis chamber includes “a fluid outlet.” This is a separate element from the fluid communication with the central chamber and presents an outlet for fluids to escape the off axis chamber and the device *without* returning to the central chamber. This allows fluids to escape from the device without creating excessive back pressure in the host weapon.

“radially serpentine”

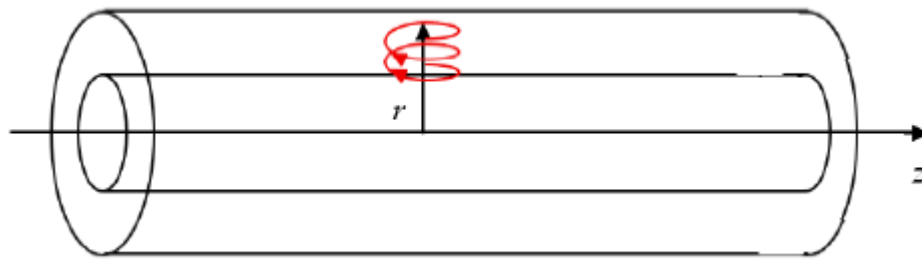


- Patent Owner agrees that “radially serpentine” means “a back and forth flow around a radius of the off axis chamber.” See Patent Owner Response (Paper 17) at 10; Institution Decision (Paper 7) at 14.
 - There is no basis to require that a “radially serpentine” fluid pathway only directs flow outwardly along a radius or requires multiple changes of direction. Patent Owner Response (Paper 17) at 10-12; Institution Decision (Paper 7) at 12-14.
- This definition includes a flow path in which fluid flows back and forth from, e.g., clockwise to counter-clockwise around the longitudinal axis, which the Board has called circumferential flow. Patent Owner Response (Paper 17) at 16; Patent Owner Surreply (Paper 23) at 3-6; Patent Owner MTA Reply (Paper 24) at 3-6.

“radially serpentine”

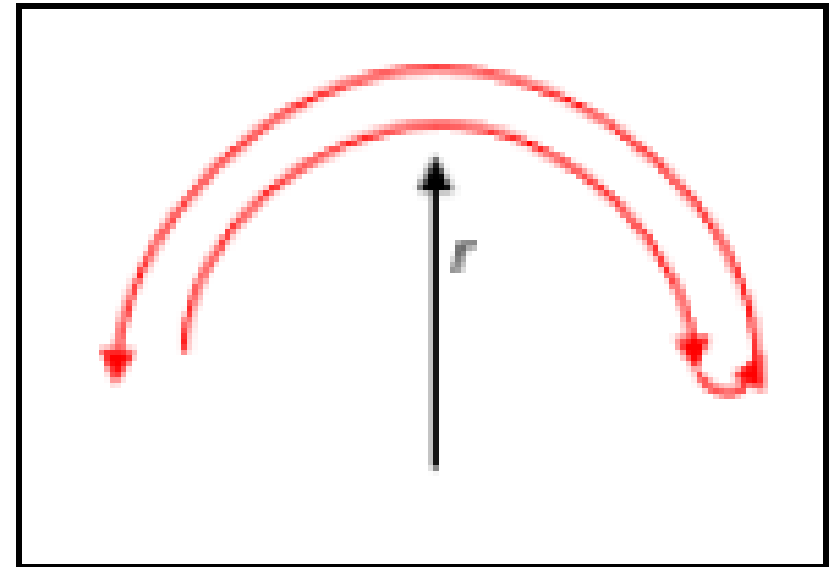


Petitioner’s View



MTA Reply (Paper 24) at 3; Ex. 2003, ¶ 32

Patent Owner’s View



MTA Reply (Paper 24) at 5; Ex. 2003, ¶ 36.

“radially serpentine”

The off axis chamber can include multiple internal walls 115, 120, 125, 130, 140, 145, 150, and/or 155 defining a serpentine or winding fluid pathway. The multiple internal walls can provide an increased volume for fluid expansion and increased acoustic absorbent path length. The fluid pathway can be an axially serpentine fluid pathway which causes fluids received in the off axis chamber to travel back and forth along a length of the off axis chamber. In another aspect, the fluid pathway can be a radially serpentine fluid pathway which causes the fluids received in the off axis chamber to flow back and forth around a radius of the off axis chamber. In another aspect, the fluid pathway can be a radially serpentine pathway which causes the fluids to flow back and forth around a radius of the off axis chamber while also traversing a length of the off axis chamber. In yet another aspect, the fluid pathway can be a helical fluid pathway which causes the fluids to spiral around the central chamber within the off axis chamber along a length of the off axis chamber. The various configurations can be integrated into various combinations as well to produce more complex flow paths.

“radially serpentine”

Claims 1, 8, 9 and 17-20 were amended. Claims 21- were added. The amendment to Claims 1, 17 and 20 introduce the limitation that the fluid pathway is at least one of axially serpentine, i.e. fluids travel back and forth along the length of the off axis chamber, and radially serpentine, i.e. fluids travel in an alternating clockwise to counterclockwise pattern. Support for this amendment related to axially serpentine can be found at page 7, lines 18-21, Figures 1a and 16, and throughout the filed specification. Support for radially serpentine flow can be found at page 7, lines 21-24 and FIG. 14.

Applicant wishes to also emphasize the terminology and nature of the claimed invention. Specifically, each of the independent claims requires “at least one of an axially serpentine and radially serpentine” fluid pathway. Axially serpentine refers to a serpentine fluid flow forward and back along the length of the off axis chamber. Figure 1a illustrates one version of this arrangement where fluid flow goes lefts and right switching directions at the end of each concentric tube. This axially serpentine flow is different from radially serpentine flow in which fluid would flow back and forth from clockwise to counter-clockwise around the axis as described in page 7, lines 20-22 and shown in Figure 14 (see units 500, 505 and 510).

“radially serpentine”

Applicant wishes to also emphasize the terminology and nature of the claimed invention. Specifically, each of the independent claims requires “at least one of an axially serpentine and radially serpentine” fluid pathway. Axially serpentine refers to a serpentine fluid flow forward and back along the length of the off axis chamber. Figure 1a illustrates one version of this arrangement where fluid flow goes lefts and right switching directions at the end of each concentric tube. This axially serpentine flow is different from radially serpentine flow in which fluid would flow back and forth from clockwise to counter-clockwise around the longitudinal axis as described in page 7, lines 20-22 and shown in Figure 14 (see units 500, 505 and 510).

“radially serpentine”

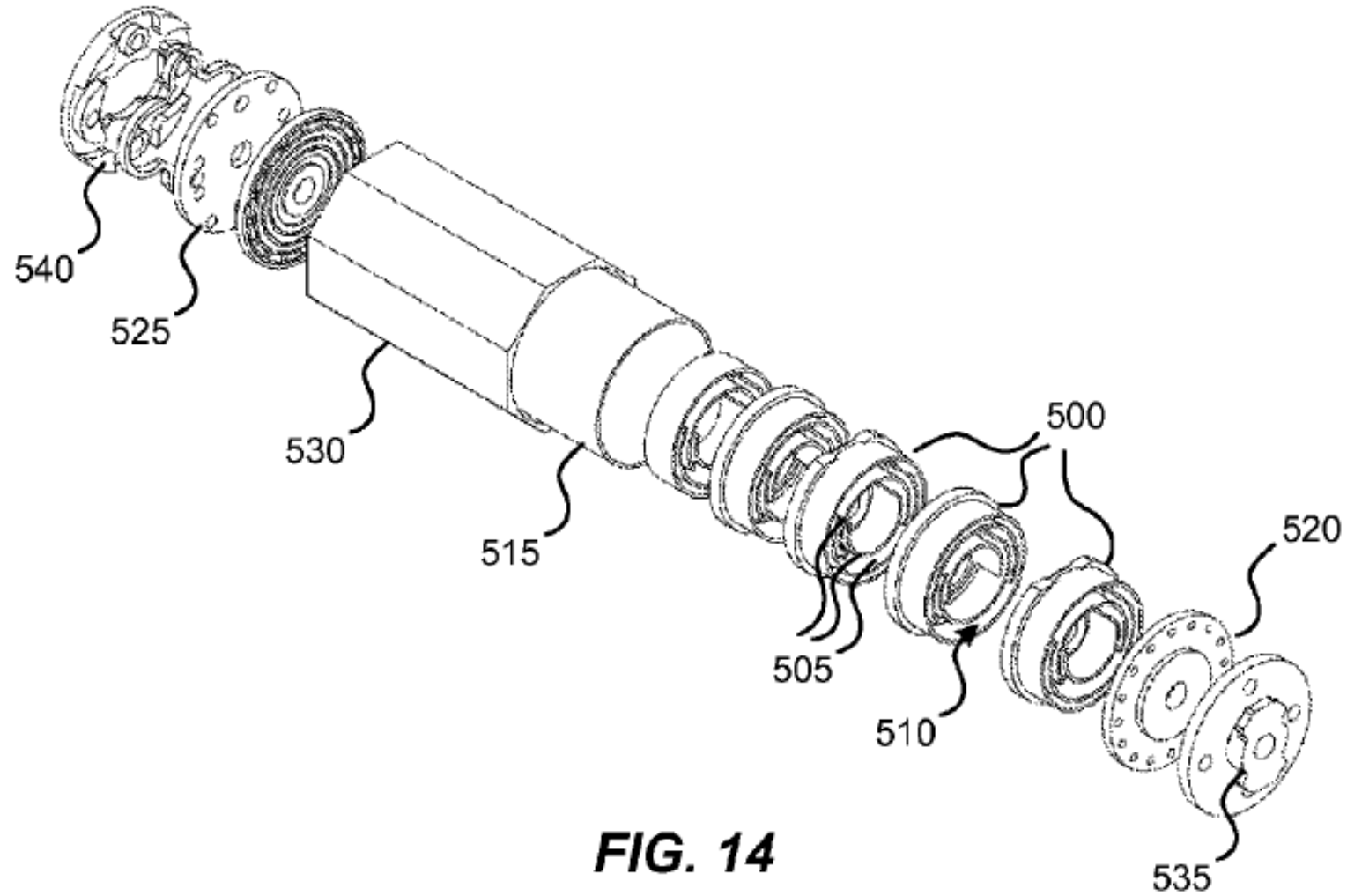
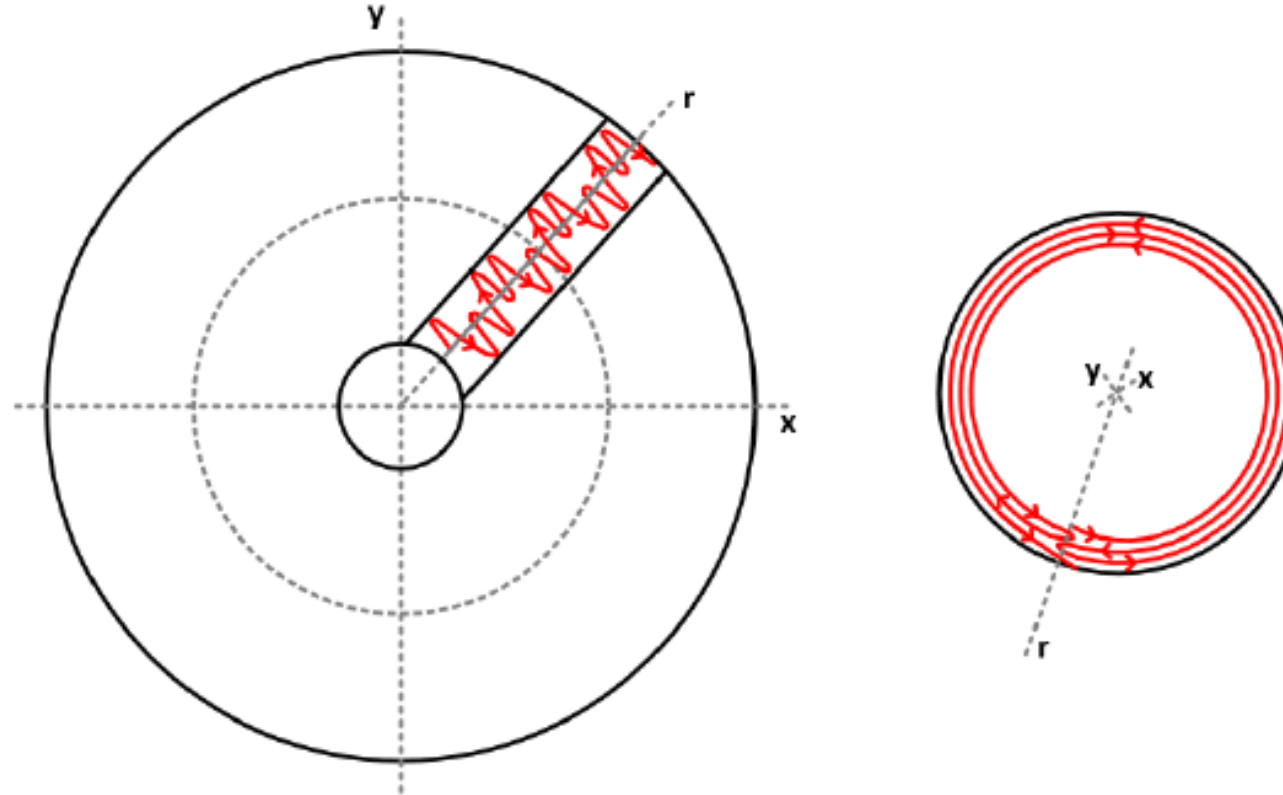


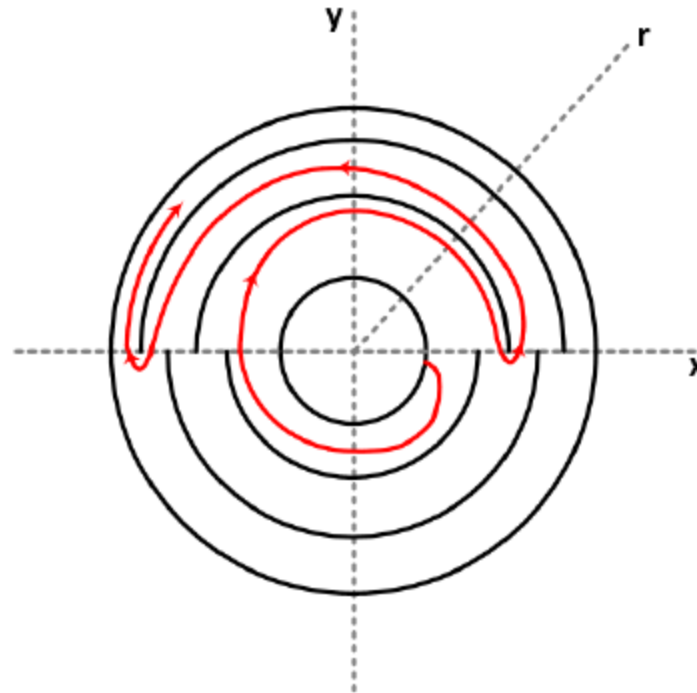
FIG. 14

“radially serpentine”



EX1013, 53, Figure 1 (Depiction of “radially serpentine” given in lines 34-37 of column 4 of the ’750-Patent)

“radially serpentine”



EX1013, 55, Figure 2 (Depiction of “radially serpentine” in FIG. 14 and prosecution history context)

“radially serpentine”

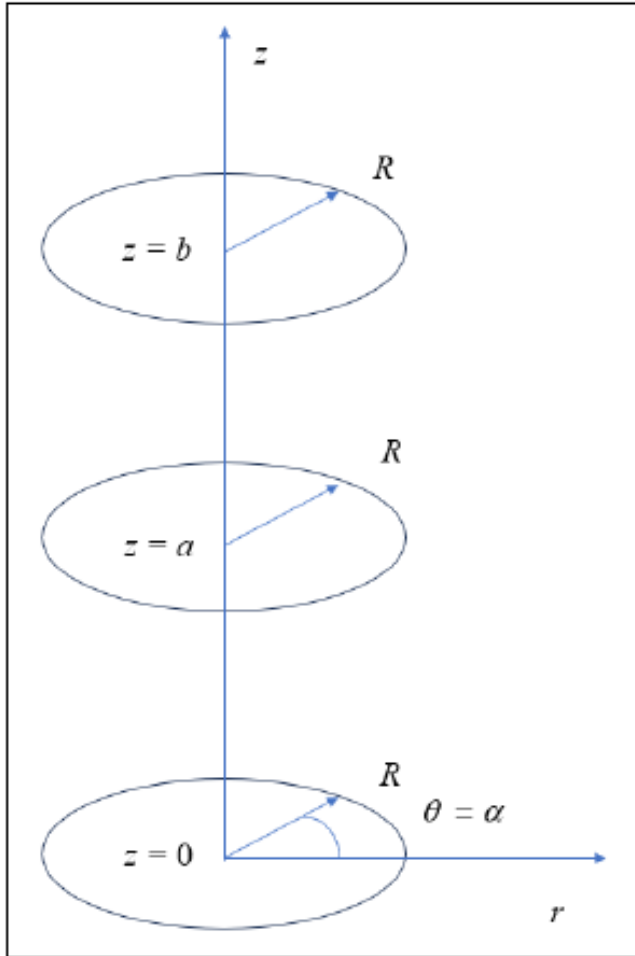
created by offset and spaced cylinders 505. EX1001 at 9:11-13. In other words, the radially serpentine fluid pathway illustrated in FIG. 14 is a pathway that serpentine back (*i.e.*, counterclockwise) and forth (*i.e.*, clockwise) while advancing radially outward through a series of annular spaces that are connected and progressively larger. *See* Figure 2 below.

“radially serpentine”

“The prosecution history, in particular, may be critical in interpreting disputed claim terms, and even where prosecution history statements do not rise to the level of unmistakable disavowal, they do inform the claim construction.... We cannot look at the ordinary meaning of the term ... in a vacuum. Rather, we must look at the ordinary meaning in the context of the written description and the prosecution history.... We conclude that the claim language is not plain in the respect at issue and that the proper interpretation is determined by the specification and, most pointedly, by the prosecution history.”

Univ. of Mass v. L'Oréal S.A., 36 F.4th 1374, 1379 (Fed. Cir. 2022) (internal citations and quotation marks omitted); *see also* MTA Reply (Paper 24) at 5

“radially serpentine”



- Patent Owner’s view of “radially serpentine” does not require multiple radii.
- The ’750 patent describes cylindrical device and are best described using a cylindrical coordinate system.
- A radius at a constant angle (theta) in a cylindrical coordinate system is the same, regardless of where it begins on the axis that extends the length of the cylinder (i.e., regardless of its z -axis location).

MTA Reply (Paper 24) at 5-6; Ex. 2003, ¶ 37.



(10) Patent No.: US 8,286,750 B1
(45) Date of Patent: Oct. 16, 2012

4,482,027	A	11/1984	Gould
4,501,189	A	2/1985	Brandl et al.

4,510,843

4,530,417	
4,576,082	

4,376,883
4,907,488
4,974,489
5,010,676
5,029,512
5,036,747
5,078,043
5,164,535

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Wikipedia, Su
Retrieved Jan. 20

1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 26

1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 26

Primary Exam

(74) *Attorney.*

(57) ABSTRACT

An energy capture and control device is disclosed and described. The device can include a central chamber oriented along a central axis within an outer shell, said central chamber having an inlet configured to receive a high energy material from a high energy outlet. An off axis chamber can be oriented within the outer shell in fluid communication with the central chamber. The off axis chamber can have a fluid outlet and multiple internal walls to produce a serpentine fluid pathway which dissipates the high energy material.



22

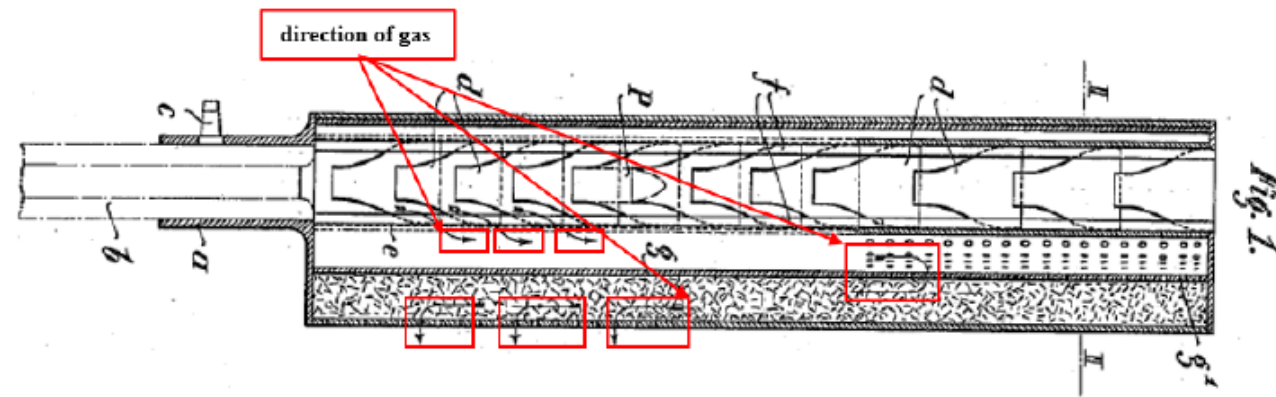
DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

23

Claim 9 Not Invalid Over Thurler (Grounds 1 and 2)



Thurler does not disclose a “radially serpentine” fluid pathway.



EX1015, FIG. 1 (annotated)

Claim 9 Not Invalid Over Thurler (Grounds 1 and 2)

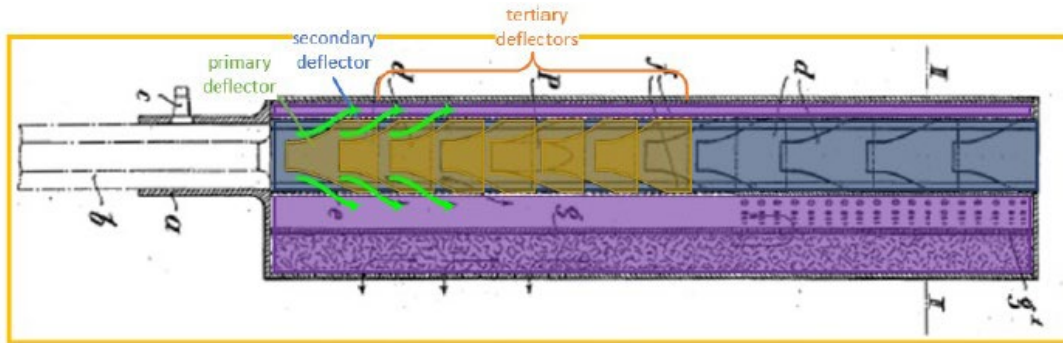
18 Q. Do you consider -- well, let me
19 rephrase that.

20 So how would you, within the
21 context of what we were discussing as far as
22 "radially serpentine or axially serpentine, or
23 both," how do you view -- how would you
24 describe the pathway that the gases flow in
25 Thurler?

1 A. That would be axially serpentine.

Claim 6 Not Obvious Over Thurler (Ground 2)

6. The device of claim 5, wherein the fluid communication between the common off axis chamber and the central chamber occurs only at the primary deflector, the secondary deflector and a first tertiary deflector.



EX1015, FIG. 1 (Petitioner-annotated)

- Thurler does not suggest shorter or longer perforation configurations.
- Thurler does not suggest any connection between the sleeves d and the length of perforation.

Ground 3 – Thurler/Bouton



(12) **United States Patent**
Oliver

(10) Patent No.: US 8,286,750 B1
(45) Date of Patent: Oct. 16, 2012

(54) ENERGY CAPTURE AND CONTROL DEVICE

(75) Inventor: **Russell Oliver**, Sandy, UT (US)

(73) Assignee: **O.S.S. Holdings, LLC**, Murray, UT
(US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: 13/025,989

(22) Filed: Feb. 11, 2011

Related U.S. Application Data

(60) Provisional application No. 61/303,553, filed on Feb. 11, 2010, provisional application No. 61/418,285, filed on Nov. 30, 2010.

(51) **Int. Cl.**
F41A 21/00 (2006.01)

(52) **U.S. CL.** 181/223; 89/14.4

(58) **Field of Classification Search** 181/223;
89/14,4

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

748,157 A	12/1903	Bouton	
822,127 A	5/1906	Hufnagel	
916,885 A	3/1909	Maxim	
1,341,363 A *	5/1920	Fiala	181/223
1,427,802 A	9/1922	Goodwin	
1,462,158 A	7/1923	Wildner	
1,736,319 A	11/1929	Maxim	
1,773,443 A	8/1930	Wilman	
2,214,996 A	7/1950	Faust, Jr.	
3,667,570 A *	6/1972	Werbell, III	181/223
3,693,750 A	9/1972	Takkenun	
4,454,798 A	6/1984	Shea et al.	

4,482,027	A	11/1984	Gould	
4,501,189	A	2/1985	Brandt et al.	
4,510,843	A	4/1985	Rabatin	
4,530,417	A	7/1985	Daniel	
4,576,083	*	3/1986	Sebonger, Jr.	89/14.4
4,907,488	A	3/1990	Sebonger	
4,974,489	A	12/1990	Fishbaugh	
5,010,676	A	4/1991	Kennedy	
5,029,512	*			
5,036,747	A			
5,078,043	*			
5,164,535	A			

FOREIGN
GB 743

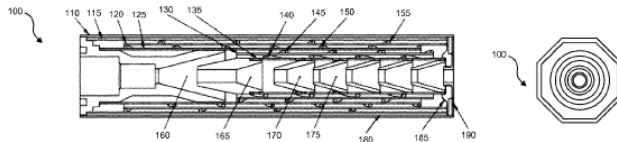
Wikipedia, Suppressor
Retrieved Jan. 26, 2010

74) Attorney, Agent
LP

(57)

access

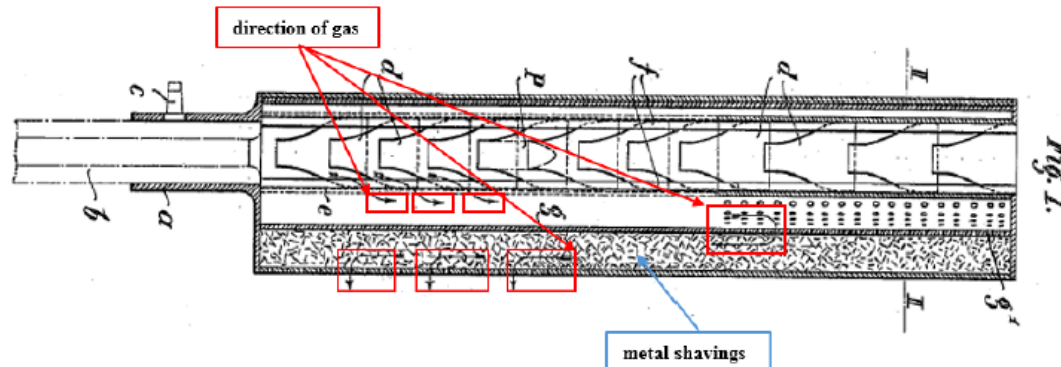
22 Claims, 10 Drawing Sheets



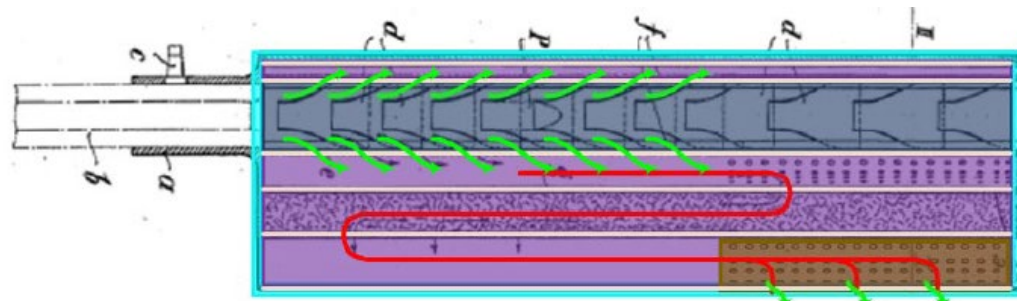
SilencerCo - EX1001 - U.S. Patent No. 8,286,750

18. The device of claim 1, wherein the outer shell includes an end cap assembly at an outlet end of the central chamber and which allows fluid to escape from the common off axis chamber through the fluid outlet, the fluid outlet being only accessible to the fluid in the common off axis chamber.

Claim 18 Not Obvious Over Thurler/Bouton



EX1015, FIG. 1 (annotated)

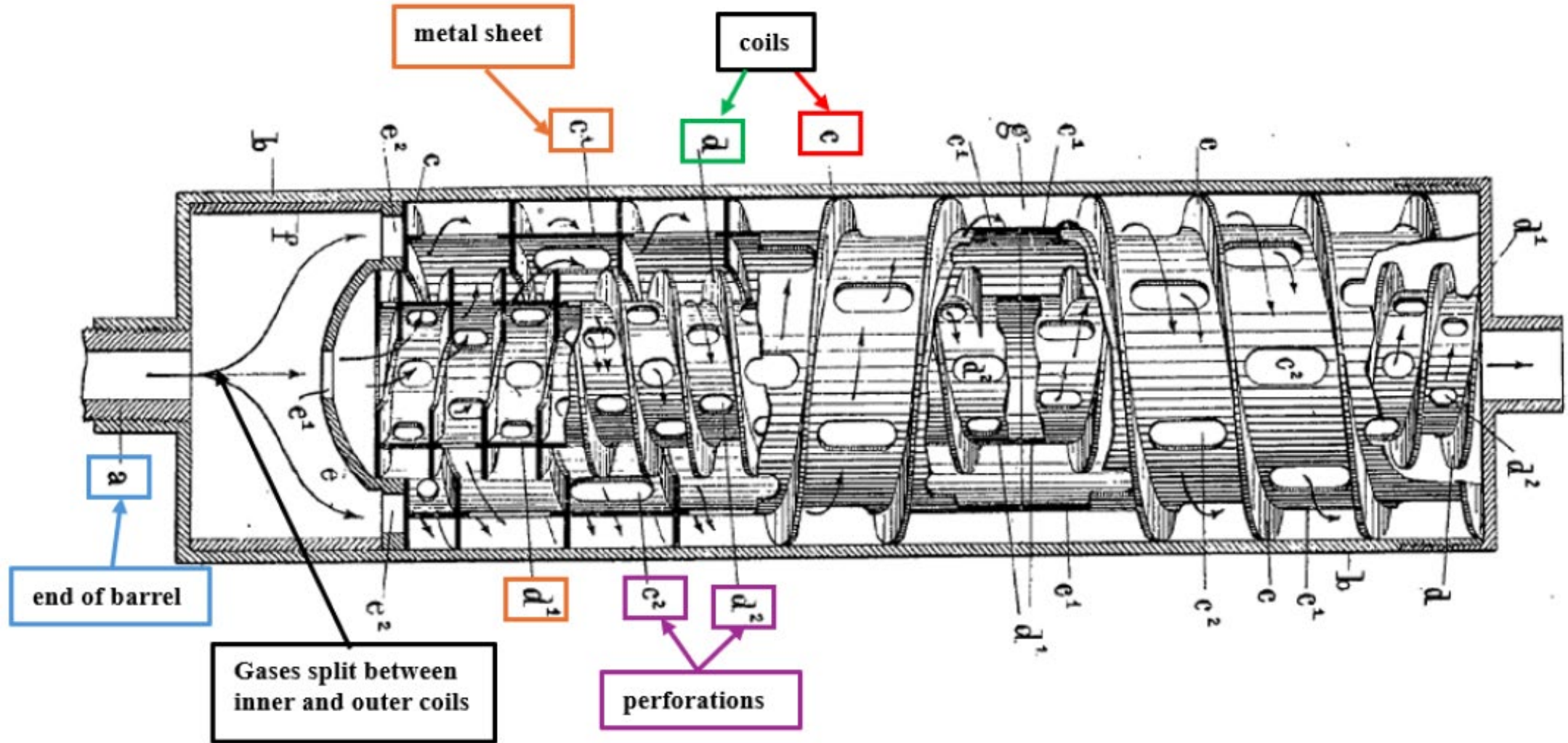


(Petitioner-modified ESD_1 of Thurler)

- A POSITA would not modify Thurler such that the “fluid outlet” is located “at an outlet end of the central chamber.”
- Thurler’s design directs gas downward through metal shavings and out the bottom of the device near the inlet.
- Thurler offers no reason to change this arrangement, even if additional tubes are added.

Patent Owner Response (Paper 17) at 38-41; Patent Owner Surreply (Paper 23) at 12-13; Thurler (Ex. 1015), Fig. 1

Ground 4 – Thurler/Barlowatz



Ground 4 – Thurler/Barlowatz

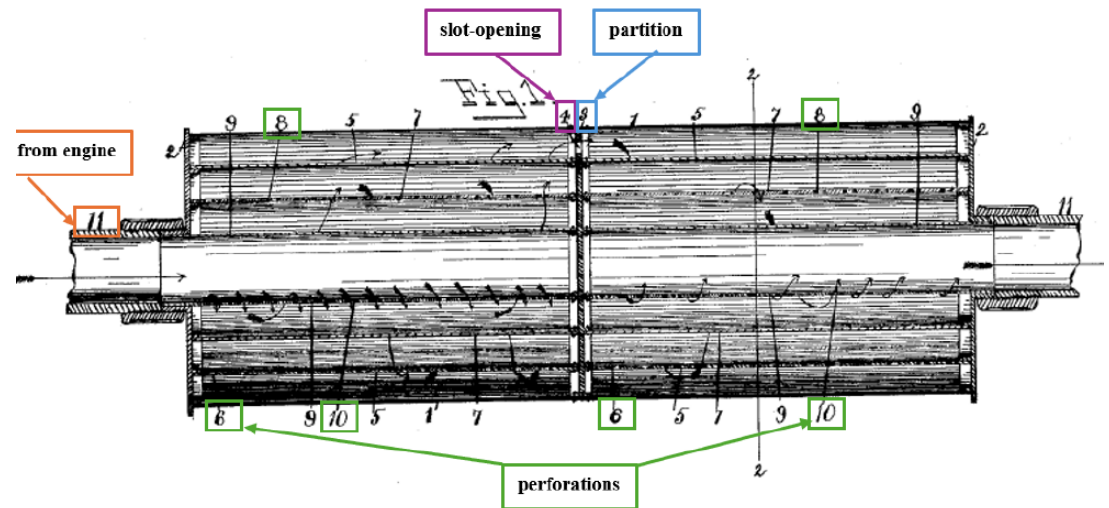
- Claims 6, 9, 12, 13, 14, and 20 are not obvious over Thurler in view of Barlowatz.
- Thurler teaches different approaches to lengthening fluid pathways than Barlowatz.
- Barlowatz discloses a fundamentally different design for providing a fluid pathway than Thurler, relying on two coils oriented in different directions.
 - Inserting one of Barlowatz's coils would defeat Barlowatz's goal of allowing gases to split and counteract one another.
 - Inserting both of Barlowatz's coils would counteract, if not prevent, the flow desired by Thurler.

Grounds 5 and 6 (Barlowatz alone)

- Claim 9 is not invalid over Barlowatz because it does not disclose a “fluid outlet.”
 - A “fluid outlet” is an outlet for fluids to escape the off-axis chamber without returning to the central chamber.
 - Modifying Barlowatz to have a “fluid outlet” would undermine Barlowatz’s purpose of allowing the gases in the two coils to counteract each other.
- Claim 20 is not invalid over Barlowatz because it does not disclose a *plurality* of deflectors.”
 - Each turn of a coil in Barlowatz is part of a single, continuous “helically wound metal strip.”
 - Modifying Barlowatz “by increasing or decreasing the winding of the coils,” as Petitioner suggests, would not change this fact.

Ground 7 (Barlowatz/Reeves)

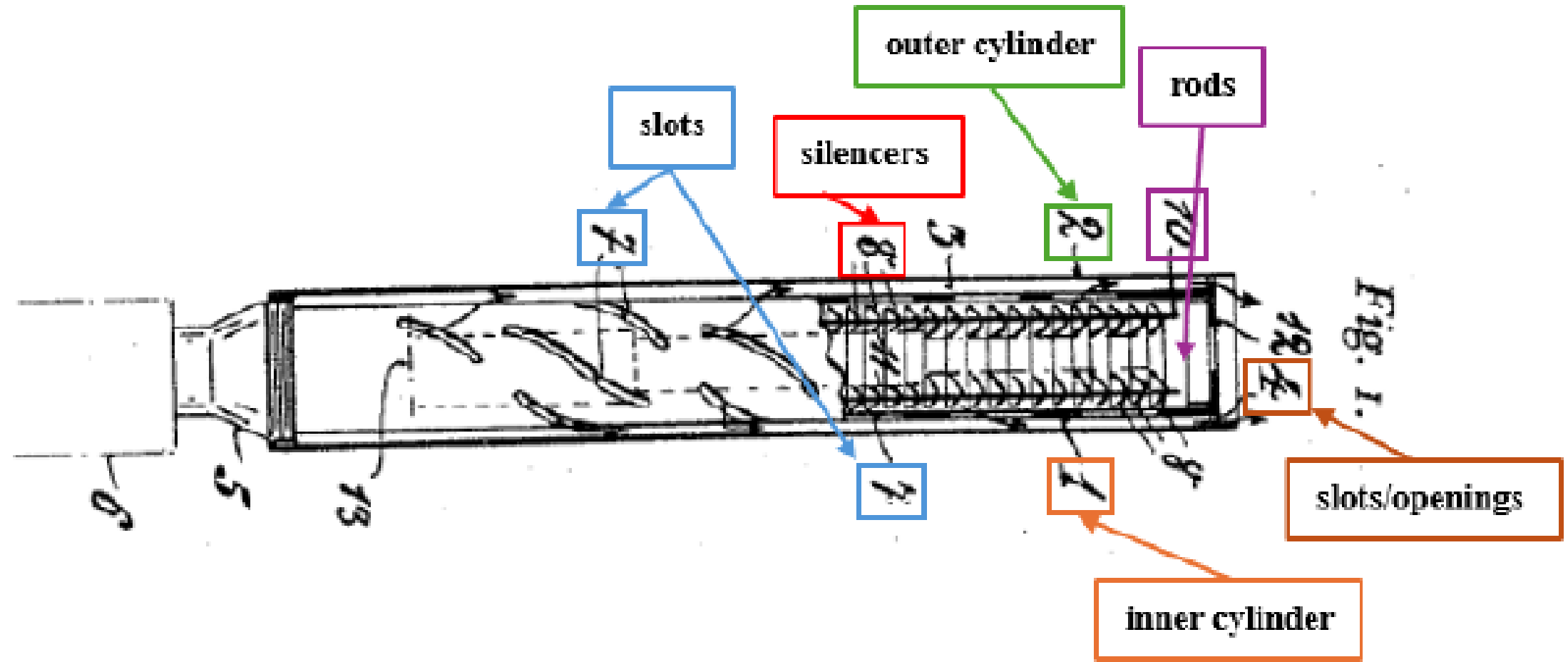
- Claim 2 is not obvious over Barlowatz in view of Reeves because neither Barlowatz nor Reeves discloses a “fluid outlet.”
- Like Barlowatz, the fluids in Reeves escape from a central chamber, not an off-axis chamber.



Ground 7 (Barlowatz/Reeves)

10 Q. No.
11 Let me just -- so -- yeah.
12 So for this -- for Reeves, this
13 exhaust muffler, as it's titled, as the gases
14 come in from the left, they expand out into
15 those chambers, and then they all exit out the
16 end on the right, correct?
17 A. That's correct.
18 Q. Okay.
19 While I just clarified, they --
20 they exit where the arrow is shown on the
21 right, right?
22 (No pause.)
23 I believe that's -- I believe
24 that's where all the gases go as this -- as
25 the exhaust passes through this device.
1 Right?
2 A. That's correct. Yes.

Ground 8 (Eichenseher/Barlowatz)



Claims 3, 9, and 18 Are Not Obvious Over Ground 8

- Eichenseher's purpose is "to ensure that the gases swirling with the projectile ... can quickly escape through slots 7 into cavity 3 and from there through openings 4 into the open air with as little resistance as possible." Eichenseher (Ex. 1021) at 1.
- Barlowatz lacks a "fluid outlet" because it directs gases back to the inner coil so that the gases counteract each other.
- Combining Eichenseher would result in either:
 - A device with Barlowatz's coils in which gases exit out of the alleged off-axis chamber, defeating Barlowatz's purpose, or
 - A device with Barlowatz's coils in which gases exit out the central chamber, defeating Eichenseher's purpose.

Patent Owner's Motion to Amend

- Contingent as to claims 2, 3, 6, 9, 12-14, and 20
- Non-contingent as to claims 1, 4, 5, 7, 8, 10, 11, 15-17, 19, 21, and 22
- Patent Owner does not seek to amend claim 18.
- There is no dispute that:
 - (1) Patent Owner proposed a reasonable number of substitute claims.
 - (2) The Proposed Substitute Claims respond to the grounds of unpatentability.

See generally MTA (Paper 18); Petitioner Opp. to MTA (Paper 21); Preliminary Guidance (Paper 22); Patent Owner Reply ISO MTA (Paper 24); Petitioner Surreply in Opp. to MTA (Paper 34)

Proposed Substitute Claim 23

123. An energy capture and control device for use with a weapon, comprising:

- a) a central chamber oriented along a central axis within an outer shell oriented along the central axis, said central chamber having an inlet configured to receive a high energy material comprising a projectile and gases from a high energy outlet of the weapon; and
- b) a common off axis chamber oriented within the outer shell in fluid communication with the central chamber and having a fluid outlet and multiple internal walls defining a serpentine fluid pathway which is at least one of axially serpentine and radially serpentine and which dissipates energy transferred from the high energy material, wherein the fluid outlet is located at an opposite end of the energy capture and control device as the inlet; and
- c) a plurality of deflectors oriented in series along the central axis of the central chamber and configured to deflect the energy from the high energy material to the common off axis chamber.

Patent Owner's Motion to Amend

Three disputed issues:

- (1) Whether Proposed Substitute Claim 43 enlarges the scope of the claims.
- (2) Whether the term “radially serpentine” adds new subject matter.
- (3) Whether the proposed substitute claims are patentable.

Proposed Claim 43 Does Not Enlarge Claim Scope

~~2243.~~ A method for energy capture and control from a ~~high energy device~~ weapon, comprising:

- a) discharging a high energy material comprising a projectile and gases from the ~~high energy device~~ weapon through an energy capture and control device comprising a central chamber oriented along a central axis within an outer shell oriented along the central axis, said central chamber having an inlet configured to receive a the high energy material from a high energy outlet of the weapon, and a common off axis chamber oriented within the outer shell in fluid communication with the central chamber, the common off axis chamber comprising an axially serpentine fluid pathway and a fluid outlet, wherein the fluid outlet is located at an opposite end of the energy capture and control device as the inlet; and
- b) capturing energy within the common off axis chamber via a plurality of orifices from the central chamber using the axially serpentine fluid pathway, the energy being associated with discharge of the high energy material from the ~~high energy discharge device~~ weapon.

“Radially Serpentine” Does Not Introduce New Subject Matter.

- “Radially serpentine” appears in the original claims.
- The construction of “radially serpentine” that the parties agree to and the Board applied is disclosed nearly verbatim in the application.
- A “radially serpentine” fluid pathway is disclosed at least by Figure 14.

“Radially Serpentine” Does Not Introduce New Subject Matter.

The off axis chamber can include multiple internal walls 115, 120, 125, 130, 140, 145, 150, and/or 155 defining a serpentine or winding fluid pathway. The multiple internal walls can provide an increased volume for fluid expansion and increased acoustic absorbent path length. The fluid pathway can be an axially serpentine fluid pathway which causes fluids received in the off axis chamber to travel back and forth along a length of the off axis chamber. In another aspect, the fluid pathway can be a radially serpentine fluid pathway which causes the fluids received in the off axis chamber to flow back and forth around a radius of the off axis chamber. In another aspect, the fluid pathway can be a radially serpentine pathway which causes the fluids to flow back and forth around a radius of the off axis chamber while also traversing a length of the off axis chamber. In yet another aspect, the fluid pathway can be a helical fluid pathway which causes the fluids to spiral around the central chamber within the off axis chamber along a length of the off axis chamber. The various configurations can be integrated into various combinations as well to produce more complex flow paths.

The Proposed Substitute Claims Are Patentable

Grounds	35 U.S.C.
GROUND 1: Proposed Amended Claims 23, 26, 27–30, 32, 33, 37–39, 40, and 43 are rendered obvious by Thurler in view of Kenney and WerBell.	103 (pre-AIA)
GROUND 2: Proposed Amended Claims 34–36, 41 and 42 are rendered obvious by Thurler in view of Kenney, WerBell, and Barlowatz.	103 (pre-AIA)
GROUND 3: Proposed Amended Claim 24 is rendered obvious by Thurler in view of Kenney, WerBell, Barlowatz and Reeves.	103 (pre-AIA)
GROUND 4: Proposed Amended Claims 25 and 31 are rendered obvious by Thurler in view of Kenney, WerBell, Barlowatz and Eichenseher.	103 (pre-AIA)

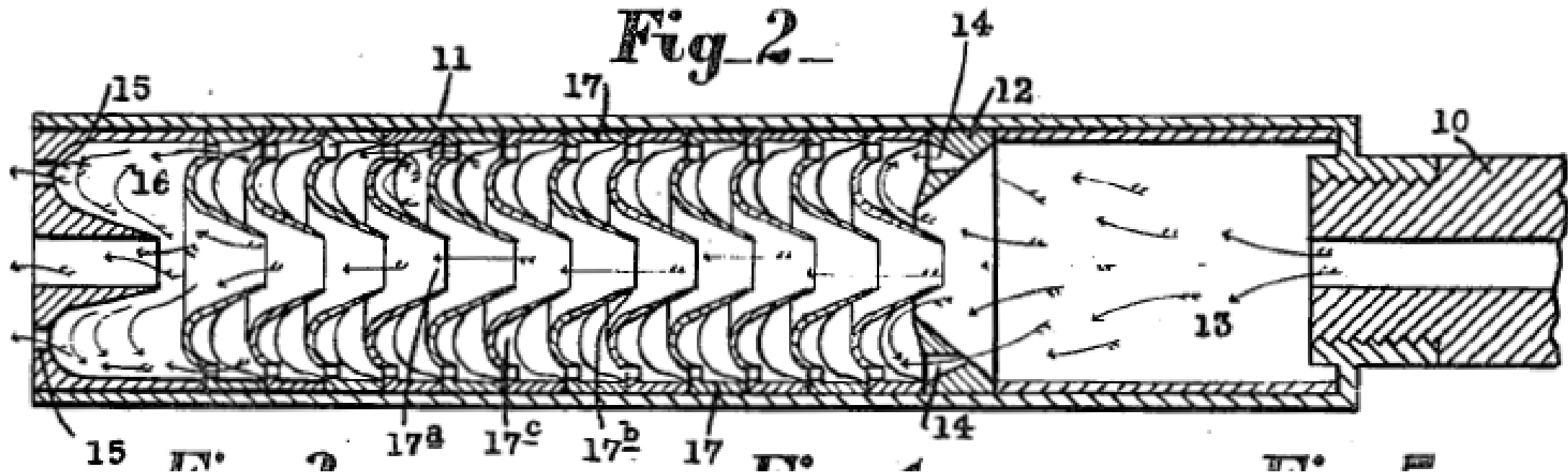
Arguments Incorporated By Reference Should Be Disregarded

“(3) Incorporated by reference; combined documents. Arguments must not be incorporated by reference from one document into another document. Combined motions, oppositions, replies, or other combined documents are not permitted.”

MTA Ground 1 (Thurler/Kenney/WerBell)

- A POSITA would not combine Thurler, Kenney, and WerBell to achieve “a central chamber oriented along a central axis within an outer shell oriented along the central axis.”
- Thurler quickly strips gases from the central chamber, leading them through an axially serpentine path to exit the side.
- Kenney relies on concentricity to form a “jacket of bases” around the bullet’s path, both inside the device and upon exit of the bullet, to prevent “rapid destruction of the vacuum.”

MTA Ground 1 (Thurler/Kenney/WerBell)



MTA Ground 1 (Thurler/Kenney/WerBell)

One of the important features of my invention consists of means for so controlling and directing the exhaust and discharge of the gases that a jacket of said gases, substantially concentric with the axial center of the path of the bullet, is provided around said path, thus preventing, or rather retarding, the rapid destruction of the vacuum in the atmosphere incident to the discharge of the arm. I have also provided effective means for expanding the gases, as they pass from the muzzle proper of the arm, and for separating said gases into a plurality of sections, as well as for subsequently reuniting the said gases and for discharging them, or a considerable volume of them, in the form of a concentric jacket, as I have just explained.

It should be noted that in my described construction of silencer the gases are at no time blocked or trapped within the housing but are traveling constantly toward the discharge openings in the muzzle end of said silencer. Meanwhile they (the gases) are equalized as to force, obstructed, and gradually reduced as to velocity, as they pass forwardly through the silencer. By thus providing for a constant forward movement and discharge of the gases, I am able to produce a silencer that may be utilized safely with automatic, and other rapid fire arms.

MTA Ground 1 (Thurler/Kenney/WerBell)

- A POSITA would not combine Thurler, Kenney, and WerBell to achieve a “fluid outlet [that] is located at an opposite end of the energy capture and control device as the inlet.”
- Kenney does not disclose a “fluid outlet.”
 - A “fluid outlet” is an outlet for fluids to escape the off axis chamber and the device without returning to the central chamber, and Kenney does not disclose directing fluids to an off-axis chamber.
- Thurler and Kenney are incompatible.
 - Thurler employs a circuitous fluid path.
 - Kenney employs a pathway in which “gases are at no time blocked or trapped within the housing but are traveling constantly toward the discharge opening in the muzzle end of the silencer.” Kenney (Ex. 1039) at 2:39-44.

MTA Ground 2 (Thurler/Kenney/WerBell/Barlowatz)

- Proposed Substitute Claims 34-36, 41, and 42 depend from independent claims at issue in MTA Ground 1 and are thus patentable.
- A POSITA would not combine Thurler and Barlowatz to achieve the helical wall limitations of Proposed Substitute Claims 34-36 and 41.
- A POSITA would not modify Thurler in view of Kenney or WerBell to achieve a device with multiple concentric tubes, as required by Proposed Substitute Claim 42.

MTA Ground 3 (Thurler/Kenney/WerBell/Barlowatz/Reeves)

- Proposed Substitute Claim 24 depends from independent Proposed Substitute Claim 23 at issue in MTA Ground 1 and is thus patentable.
- Reeves does not disclose deflectors and thus cannot disclose a “plurality of sub-chambers” that is “defined by the plurality of deflectors.”

MTA Ground 4 (Thurler/Kenney/WerBell/Barlowatz/Eichenseher)

- Proposed Substitute Claims 25 and 31 depend from independent Proposed Substitute Claim 23 at issue in MTA Ground 1 and are thus patentable.
- Petitioner does not explain how Eichenseher discloses a mounting mechanism with a “hollow interior with a reducing throat portion and a flared outlet,” as required by Proposed Substitute Claim 25.
- A POSITA would not have modified Thurler in view of Barlowatz to achieve a radially serpentine fluid pathway as required by Proposed Substitute Claim 31.