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Luongo

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(54) **STRENGTHENED, LIGHT WEIGHT WALLBOARD AND METHOD AND APPARATUS FOR MAKING THE SAME**

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This patent is subject to a terminal disclaimer.

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(58) **Field of Search** 106/672, 675, 106/677, 680, 698, 778; 156/39, 45, 346; 524/423, 444; 428/449, 537.7

(56) **References Cited**

U.S. PATENT DOCUMENTS

2,803,575	A		8/1957	Riddell et al.	
2,809,949	A		10/1957	Orth, Jr.	
3,022,184	A		2/1962	Kerr	
3,103,444	A		9/1963	Cotts	
3,190,787	A		6/1965	Muller et al.	
3,305,518	A		2/1967	Jacacki et al.	
3,414,467	A		12/1968	Ferrara	
3,720,633	A		3/1973	Nickerson	
3,984,596	A	*	10/1976	Failmezger	428/144
3,988,199	A	*	10/1976	Hillmer et al.	162/101
4,148,660	A	*	4/1979	Lankard et al.	106/675
4,148,781	A		4/1979	Narukawa et al.	
4,159,302	A	*	6/1979	Greve et al.	264/333
4,174,230	A		11/1979	Hashimoto et al.	
4,283,229	A		8/1981	Girg et al.	
4,297,311	A		10/1981	Sherman et al.	
4,313,997	A	*	2/1982	Ruff et al.	428/220
4,328,178	A		5/1982	Kossatz	
4,343,127	A		8/1982	Greve et al.	
4,369,064	A		1/1983	von Bonin	
4,392,896	A		7/1983	Sakakibara	
4,433,020	A		2/1984	Narukawa et al.	
4,483,946	A		11/1984	Barnes et al.	
4,514,471	A		4/1985	Sugimoto et al.	
4,686,253	A	*	8/1987	Struss et al.	524/44
4,695,494	A		9/1987	Fowler, Jr. et al.	
4,810,569	A		3/1989	Lehnert et al.	
5,256,222	A	*	10/1993	Shepherd et al.	156/41
5,309,690	A		5/1994	Symons	
5,336,318	A	*	8/1994	Attard et al.	106/780
5,350,554	A		9/1994	Miller	
5,422,387	A		6/1995	Toms et al.	
5,437,722	A		8/1995	Borenstein	
5,480,923	A		1/1996	Schmid et al.	
5,482,551	A	*	1/1996	Morris et al.	106/780
5,534,059	A		7/1996	Immordino, Jr.	
5,536,764	A		7/1996	Nguyen et al.	
5,558,710	A		9/1996	Baig	
5,582,670	A		12/1996	Andersen et al.	
5,648,154	A		7/1997	Koh et al.	
5,653,797	A	*	8/1997	Patel	106/781
5,676,905	A		10/1997	Andersen et al.	
5,720,913	A		2/1998	Andersen et al.	
5,723,226	A	*	3/1998	Francis et al.	428/688
5,725,656	A		3/1998	Shimanovich et al.	
5,746,822	A	*	5/1998	Espinoza et al.	106/785
5,749,954	A		5/1998	Law et al.	
5,800,756	A		9/1998	Andersen et al.	
5,810,961	A		9/1998	Andersen et al.	
5,827,457	A		10/1998	Tseng	
5,830,305	A		11/1998	Andersen et al.	
5,830,548	A		11/1998	Andersen et al.	
5,874,486	A		2/1999	Bastioli et al.	
5,879,446	A	*	3/1999	Patel et al.	106/781
5,879,825	A	*	3/1999	Burke et al.	106/802
5,886,306	A		3/1999	Patel et al.	
5,888,322	A	*	3/1999	Holland	156/39
5,922,447	A	*	7/1999	Baig	106/780

* cited by examiner

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(57) **ABSTRACT**

A novel wallboard composition is disclosed comprising a unique combination of synthetic binders selected for their ability to establish a strengthened permanent bond in the final dry state for use in a wallboard composition comprising primarily gypsum, and in a wallboard composition comprising an expanded mineral such as Perlite which largely reduces the amount of gypsum over current gypsum wallboard formulations, thus reducing the weight while maintaining the strength of the wallboard structure. In a preferred embodiment, the lightweight, strengthened wallboard of the present invention also comprises an optional covering veneer that is applied to the top ply of the face paper to provide increased strength, moisture resistance, and fire retardency, and the back paper top ply is treated to provide increased flexural strength. Additionally, this invention relates to the unique manufacturing process to produce the wallboard composition of the present invention in order to create a lightweight, strengthened, moisture resistant, and fire retardant wallboard used to cover walls and ceilings in construction applications. Still further, this invention relates to the apparatus for manufacturing the wallboard composition of the present invention, including a method and apparatus for economically converting a standard gypsum wallboard manufacturing facility into a facility for manufacturing wallboard of the present invention.

16 Claims, No Drawings