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[54] SYSTEM FOR ENHANCING TARGET DAMAGE BY WATER JET IMPACT

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[73] Assignee: The United States of America as represented by the Secretary of the Navy, Washington, D.C.

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Related U.S. Application Data

[63] Continuation-in-part of application No. 08/606,626, Feb. 26, 1996, abandoned.

[51] Int. Cl.[7] F42B 22/00

[52] U.S. Cl. 102/406; 102/305; 102/475; 102/701

[58] Field of Search 102/305, 306, 102/406, 475, 476, 701

[56] **References Cited**

U.S. PATENT DOCUMENTS

2,768,072	10/1956	Stark	52/5
3,109,373	11/1963	Saffer, Jr.	102/399
3,360,070	12/1967	Cholet et al.	181/116
3,474,732	10/1969	Thomison	149/14
3,611,932	10/1971	Clator	102/305
3,714,897	2/1973	Parker	102/492
3,796,158	3/1974	Conger	102/492
3,897,728	8/1975	Sternberg et al.	102/406
3,961,594	6/1976	Meyers	114/222
3,995,574	12/1976	Drimmer	114/20.1
4,188,884	2/1980	White et al.	114/20.1
4,337,703	7/1982	Schoner	102/406
4,744,300	5/1988	Bugiel	102/291
5,078,069	1/1992	August et al.	114/20.1
5,320,043	6/1994	Andre et al.	102/291
5,450,794	9/1995	Drimmer	102/309
5,831,206	11/1998	Cooper	114/20.1

OTHER PUBLICATIONS

"Effect of Temperature Structure on the Initial Acceleration of a Spherical Thermal"; *The Physics of Fluids;* vol. 18, No. 9, Sep. 1975.

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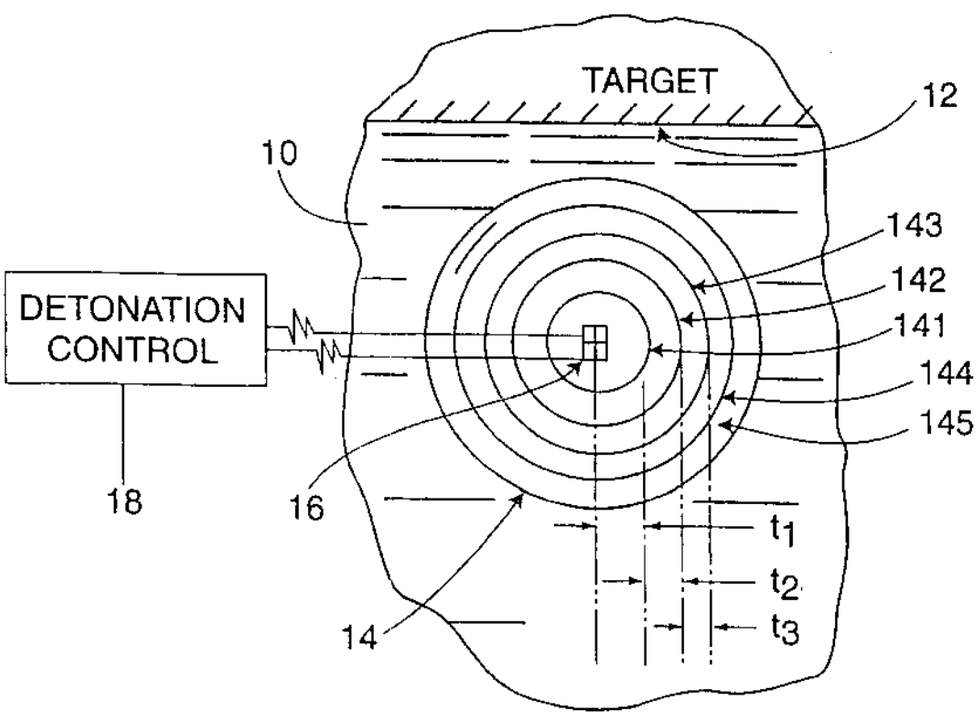
[57] **ABSTRACT**

Different compositions of layers forming a non-homogeneous explosive charge are selected so as to produce in response to underwater detonation of such explosive charge a gas bubble having a corresponding internal density distribution of explosion products to predetermine shape and direction of a water jet emerging from such bubble during collapse thereof for enhanced impact damage to an adjacent underwater target.

5 Claims, 4 Drawing Sheets