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(71) Applicant: FAHS STAGEMEYER LLC [US/US]; 25
Woodstock Meadows, Woodstock, CT 06281 (US).

(72) Inventors: FAHS, Richard, W.; 25 Woodstock Meadows,
Woodstock, GA 06281 (US). FAHS, Matthew, D., W.; 25
Woodstock Meadows, Woodstock, GA 06281 (US).

(74) Agents: PABST, Patrea, L. et al.; Pabst Patent Group
LLP, 1545 Peachtree Street, N.E., Suite 320, Atlanta, GA
30309 (US).

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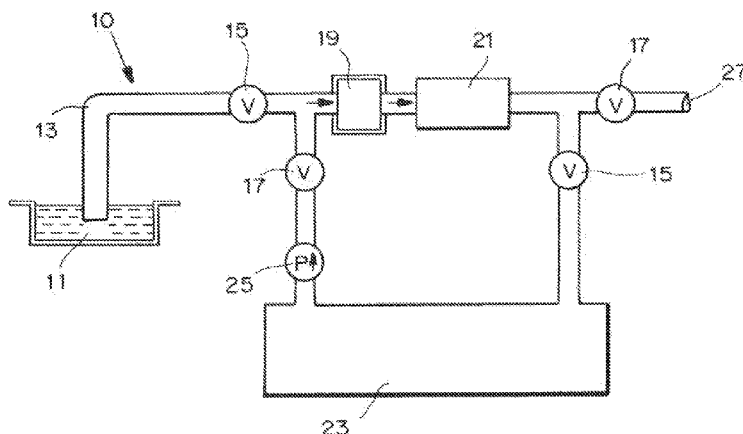


FIG. 1

(57) Abstract: A system has been developed to treat ballast water by selectively dissociating target molecules into component products compositionally distinct from the target molecule, wherein the bonds of the target molecule do not reform because the components are no longer reactive with each other. Dissociation is affected by treating the target molecule with light at a frequency and intensity, alone or in combination with a catalyst in an amount effective to selectively break bonds within the target molecule. Dissociation does not result in re-association into the target molecule by the reverse process, and does not produce component products which have a change in oxidation number or state incorporated oxygen or other additives because the process does not proceed via a typical reduction-oxidation mechanism.