TO; John Tantlinger Ed. D. Branch Manager TEL 1-808-587-3807
Strategic Technology & Industry Development Branch FAX 1-808-587-2536
235 So. Beretania Street, 5th Floor, Honolulu, Hawaii

FROM: Louis L. Watson, Inventor TEL 1-916-371-1383
1708 Ferndale Circle West Sacramento, CA. 95691 CEL 1-916=296-6149
LOUWATS@AOL.COM FAX 1-916-371-4874

RE: US Patent 6,149,855 METHOD OF MANUFACTURING A BUILDING MATERIAL FROM VOLCANIC MAGMA

DATE; 01/01/01

Dear Mr. Tantlinger

My patent will be used to make the list of products enclosed and more. On an experimental basis, magma can be dipped by hand or with a backhoe, through a skylight, to fill molds or forming machinery. On a more permanent basis, where there is a drop in the lava tube, the magma can be diverted without lifting machinery. Really heavy production will occur when the magma is delivered by a barge supported, delivery tube from the cliff face to an endless parade of mold barges. Stationary barges will support the plate and slab line machinery, as well as the machinery to make many of the other products. My patent also envisions the harvesting of the magma from the new island rising towards sea level south of the big island, but that will come later. It is unbelievable that no one has produced building materials from the flowing volcanic magma before. It has been flowing for millions of years, building up the islands of Hawaii from the ocean floor. It will be flowing from here to eternity.

The prevailing concept of volcanoes is of dangerous, uncontrollable monsters. This is generally true where they are formed by oceanic tectonic plates subducting under the continental plates. By contrast, after the initial breakthrough, flows in Hawaii and Iceland, situated on mid ocean rifts, are very manageable. In Iceland in the 1960's, using tremendous amounts of water to cool the flow, bulldozers, guided by men in water-filled hip boots, built diversion dams, hundreds of feet high by bulldozing and cooling the flowing magma. It was a tremendous effort over a period of months but it saved Iceland's best southern harbor and most of the town. Anyone reading the account of this in **The Control of Nature by McPhee** will appreciate what is possible in Hawaii.

The opportunities for Hawaii and the U.S. are unprecedented. An unrecognized, inexhaustible natural resource can now be used to make every thing from insulation to barges. Of course, Kilauea historically flows only 60% of the time, but many foods and staples are cyclic and manufacturers build up stocks to carry themselves over. It is hard to imagine that the total flow could be completely converted into usable building materials, but that is a wonderful problem. Many will be attracted to this bonanza from the producers to the tourists. The Armed Services, particularly the Corps of Engineers will be interested. Potential thousands will be directly involved with many times that in the collateral economy.

The products that can be made are ordinarily not made by the same industry. Tilt-up slabs, insulation and pipe are examples. One company, controlled by its customers, might supply the magma at wholesale prices to other companies barges as aggregate companies often supply materials to others ready-mix trucks. Transportation at sea would be very economical. To develop the maximum potential for Hawaii and the manufacturers in a short time, the magma should be free until a formulated development stage, since magma has little or no material value at this time. New corporate taxes will be the incentive for Hawaii as well as all the income taxes from those directly and indirectly involved. The key is to utilize as much of the flow as soon as possible. Slabs for tilt-up walls and paving come to mind as well as huge interlocking blocks for harbor works and sea walls etc.

Recognizing and patenting a METHOD OF MANUFACTURING A BUILDING MATERIAL FROM VOLCANIC MAGMA and methods of manufacturing the list of products was a huge step. The next big step is to assemble the persons, agencies and companies that can bring it all into fruition. This involves Federal and State government agencies and your agency must have knowledge of those in Hawaii that would jump to be involved in this great undertaking. As soon as the patent was issued, a number of companies wished to market any products on contingency, but this is not that simple. I would appreciate it if you would refer to me any business brokers and any large corporations (engineering contractors and manufacturers) such as Bechtel or Owens-Corning with whom you may have contacts. In short, this is unfamiliar territory for me and I want you to help chart the course that will yield the maximum return for all involved and concerned.

I look forward to a fruitful collaboration with you and your associates

Very truly yours,

Louis L. Watson

Louis L. Watson

BENJAMIN J. CAYETANO
GOVERNOR
SEIJI F. NAYA, Ph.D.
DIRECTOR
SHARON S. NARIMATSU
DEPUTY DIRECTOR
DAVID W. BLANE
DIRECTOR, OFFICE OF PLANNING

DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM

ENERGY, RESOURCES, AND TECHNOLOGY DIVISION
235 S. Beretania Street, 5th Floor, Honolulu, Hawaii 96813
Mailing Address: P.O. Box 2359, Honolulu, Hawaii 96804

Tel.: (808) 587-3812
Fax: (808) 586-3839

Facsimile Transmittal

FAXED

By

Date: 1/10/01

To: Mr. Lou Watson **Fax No.: 916-371-4874** **Pages Faxed: 1 of 1**

From: Dr. John Tantlinger
Energy Planner

Fax No.: 808-587-3839
Phone No.: 808-587-3805

Message:

Dear Mr. Watson:

Thank you for your 1/1/01 fax, which described your magma to construction materials process and electricity generation concepts. Besides any technical issues such a proposal must address, development of a commercial facility of this nature in Hawaii may be very problematic based on past experience.

Any use of the geothermal resource, which is owned by the State of Hawaii, would have to be permitted by the State Department of Land & Natural Resources or the County of Hawaii. This process includes public hearings, which in the past have proven to be extremely contentious.

For example, previous large-scale plans for use of Hawaii's geothermal resource; e.g., for electricity production, have been met by strong, vocal opposition, as well as legal action. Environmental and community groups have opposed development of the resource and have used the courts to prohibit any large-scale geothermal power production involving the export of electricity from the Island of Hawaii to other islands.

Some native Hawaiian groups have also expressed strong opposition, but based on cultural and religious claims that geothermal development is, in their view, an affront to the Hawaiian goddess of the volcano, Pele. Therefore, your proposed magma project is likely to raise similar concerns since magma comes from the same Hawaiian volcanic source as geothermal energy.

I hope that this information is useful to you. Should you wish to pursue development of Hawaii's mineral resources, you should contact the Hawaii Department of Land & Natural Resources.

c: Mr. Maurice H. Kaya
Ms. Carilyn O. Shon

IF YOU DO NOT RECEIVE ALL OF THE PAGES LEGIBLY, PLEASE CALL: (808) 587-3836

3P

PELE'S PRODUCTS AND POWER

POTENTIAL

Magma (molten lava) is an untapped natural resource. It has been always present but has never been utilized. Kilauea has been flowing steadily since 1983 and is currently putting 500,000 cubic yards (1 million tons) per day into the ocean. If Kilauea's flow was used as rock for breakwater construction, priced at $10 per ton, then it would produce 10 million dollars per day worth of materials. If it could replace concrete, precast in molds, to make slabs, barges, pipe, piling etc., at $50 per cubic yard, then is would be worth 25 million dollars per day. The heat energy contained in Kilauea's flow is 9,000,000 kilowatts per hour. If the efficiency of conversion to electricity is 10% and the power could be sold at $.03 per kilowatt hour, it would be worth $650,000 per day. It would require 50 large ships per day to carry the products away from Hawaii unless the material was converted into something that was floating. It is obvious that the marketing, production and logistics are well beyond anything that can be imagined today; but that is the potential! Because of the low material cost, the relatively low return shipping cost and the number of products that could be made, a share of many markets would seem assured. In most cases, the magma can be used unrefined, so its cost is insignificant compared to the many processed materials it can replace such as concrete, glass and steel. Native Hawaiians would have preference filling the new jobs, utilizing training programs at every level. The value of these basic industries would support an infrastructure of many times its value. Much of the building materials now imported for roads, buildings, pipelines etc. would be manufactured in Hawaii from its own unique natural resource.

3P INC

PELE'S PRODUCTS AND POWER

LIST OF PRODUCTS

1. Floor tile
2. Wall tile
3. Sidewalk pavers
4. Curb and gutter sections
5. Median curb sections
6. Median crash walls
7. Parking bumpers
8. Street paving bricks
9. Lamp posts
10. Power poles
11. Guard rail posts
12. Railroad ties
13. Manholes
14. Drop inlets
15. Subterranean vaults
16. Septic tanks
17. Storm drain pipe
18. Sewer pipe
19. Water mains
20. Piling
21. Floors
22. Walls
23. Roofs
24. Breakwater units
25. Harbor work, wharfs
26. Barges, floats
27. Drilling platforms
28. Floating oil storage
29. Batt insulation
30. Strand board
31. Fiberglass roving, cloth
32. Foamed (light) magma products
33. Foam flotation
34. Brick
35. Hollow block
36. Fence units
37. Hot road paving
38. Sheet piling
39. Beams
40. Arches
41. Electric power
42. Highway lane slabs

US006149855A

United States Patent [19]

Watson

[11] Patent Number: 6,149,855

[45] Date of Patent: *Nov. 21, 2000

[54] **METHOD OF MANUFACTURING A BUILDING MATERIAL FROM VOLCANIC MAGMA**

[76] Inventor: **Louis L. Watson**, 1708 Ferndale Cir., West Sacramento, Calif. 95691

[*] Notice: This patent issued on a continued prosecution application filed under 37 CFR 1.53(d), and is subject to the twenty year patent term provisions of 35 U.S.C. 154(a)(2).

[21] Appl. No.: **08/281,520**

[22] Filed: **Jul. 28, 1994**

[51] **Int. Cl.**^{7} **C04B 35/653**; B28B 7/10

[52] **U.S. Cl.** **264/334**; 264/31; 264/33; 264/299; 264/332

[58] **Field of Search** 264/332, 31, 33, 264/299, 334

[56] **References Cited**

PUBLICATIONS

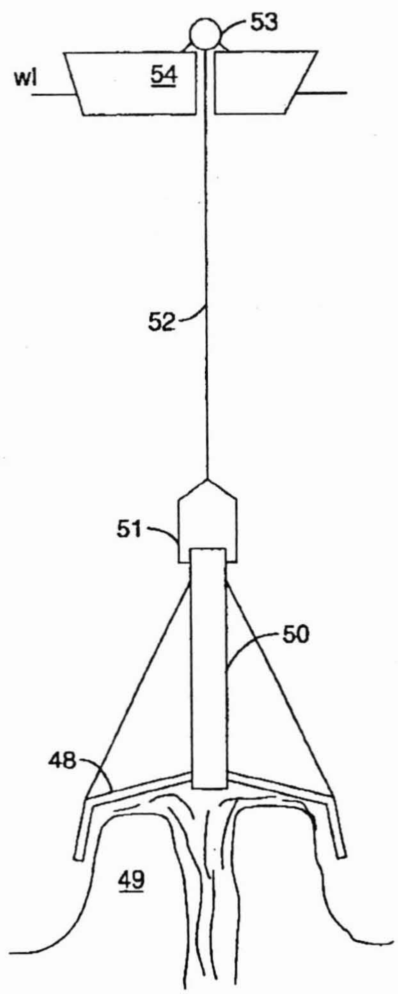
JP Abstract 04-203026 (Corresp. to App No. 02-334437) Abstract Published Nov. 1992.
J.D. Griggs, U.S. Geological survey, Apr. 1989.

Primary Examiner—Christopher A. Fiorilla
Attorney, Agent, or Firm—John P. O'Banion

[57] **ABSTRACT**

A method of manufacturing a building material includes the steps of directing molten volcanic magma from an underwater volcanic magma vent to a level above sea level via a tube formed from the magma; directing the molten volcanic magma into a mold on a floating barge; cooling the magma in the mold to form a building material; and removing the building material from the mold. The tube is formed by lowering a cap assembly over an underwater flowing volcanic magma vent and raising the cap such that the magam solidifies inside the cap perimeter where it is cold.

1 Claim, 5 Drawing Sheets



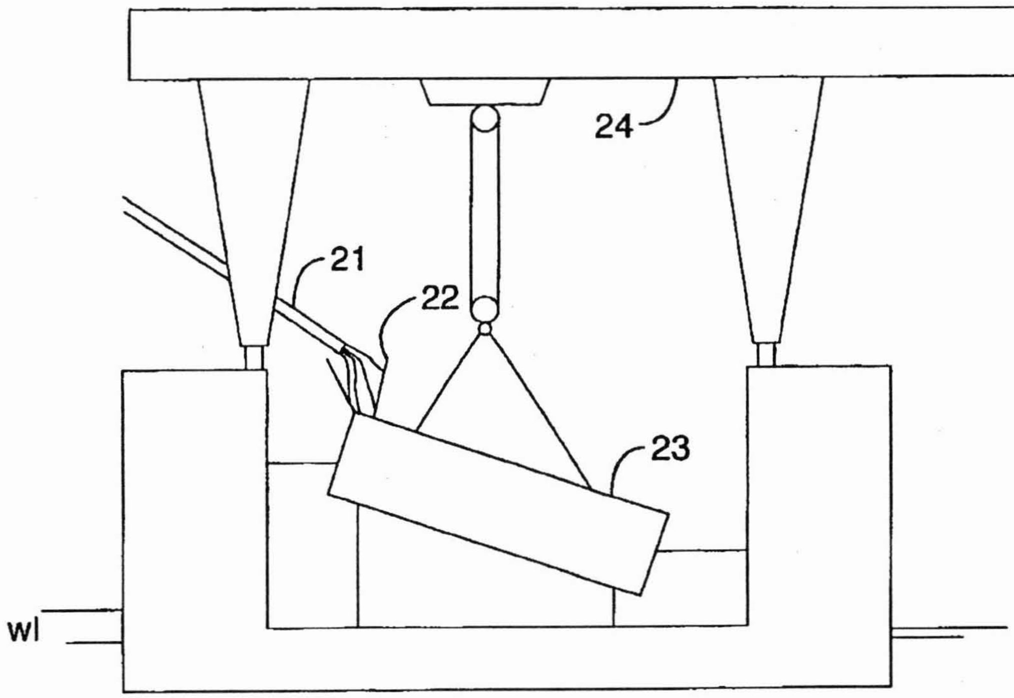


FIG. 1

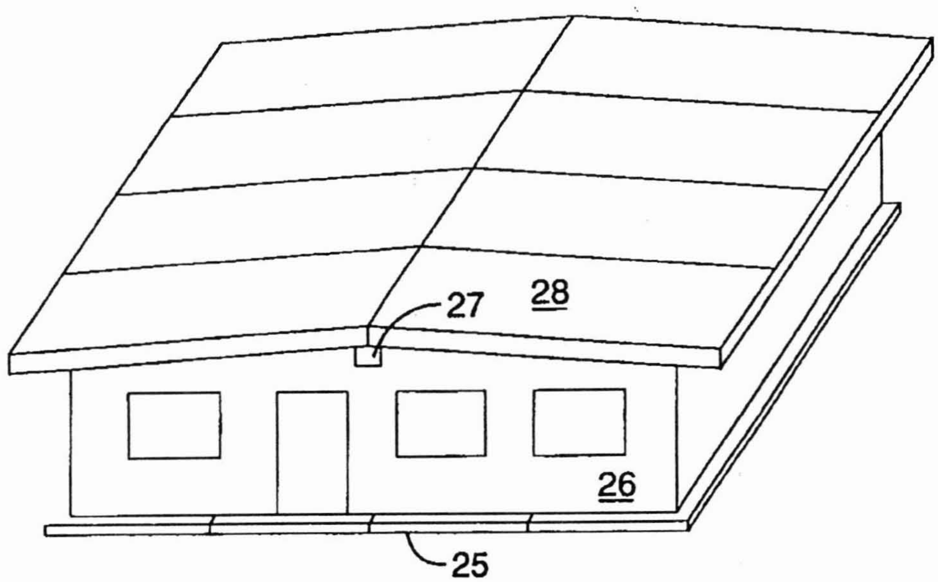


FIG. 2

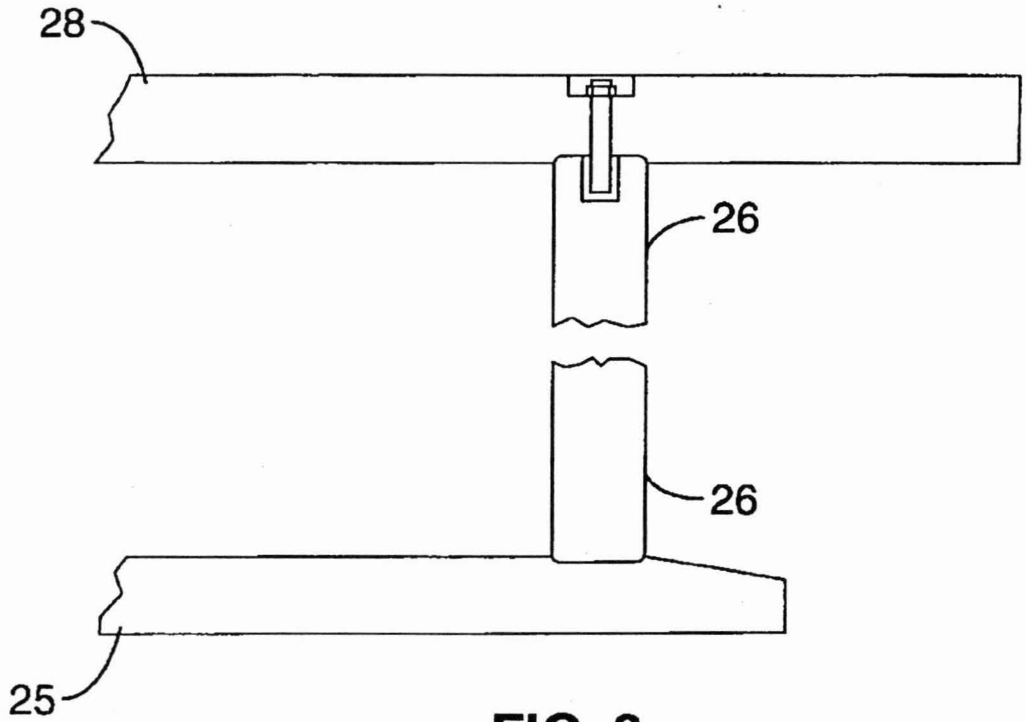


FIG. 3

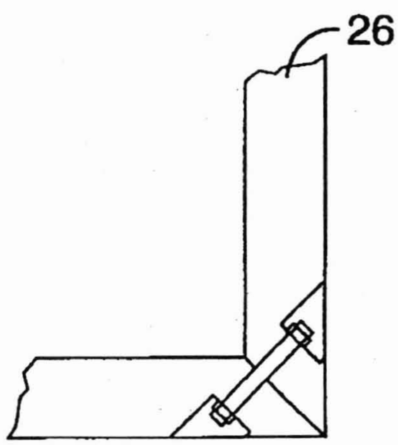


FIG. 4

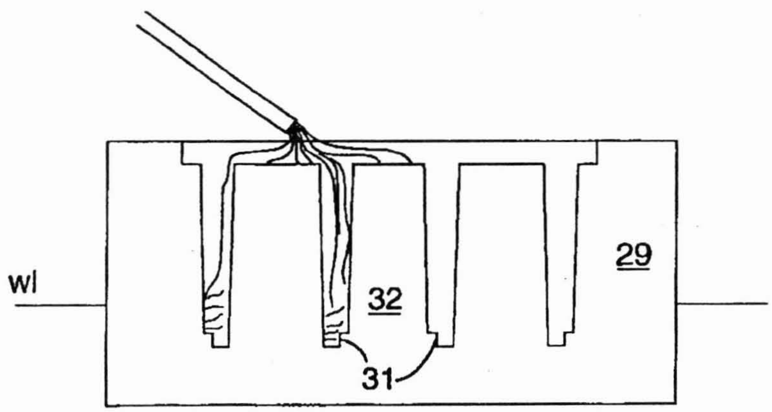


FIG. 5

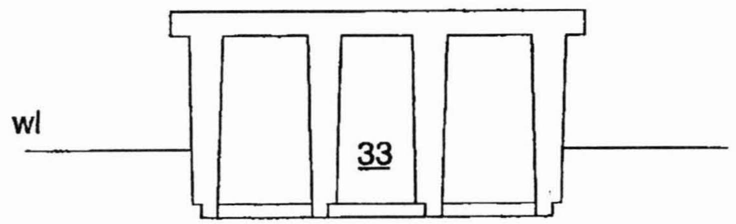


FIG. 6

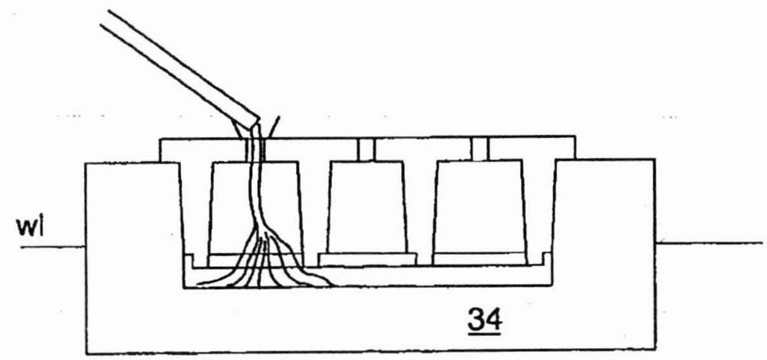


FIG. 7

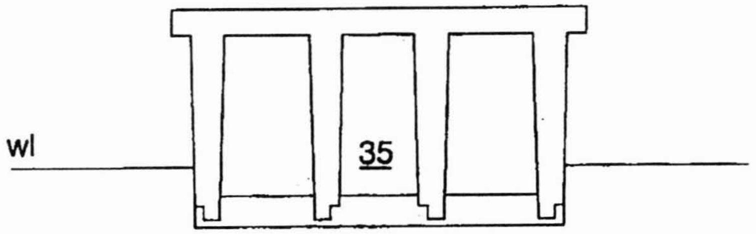


FIG. 8

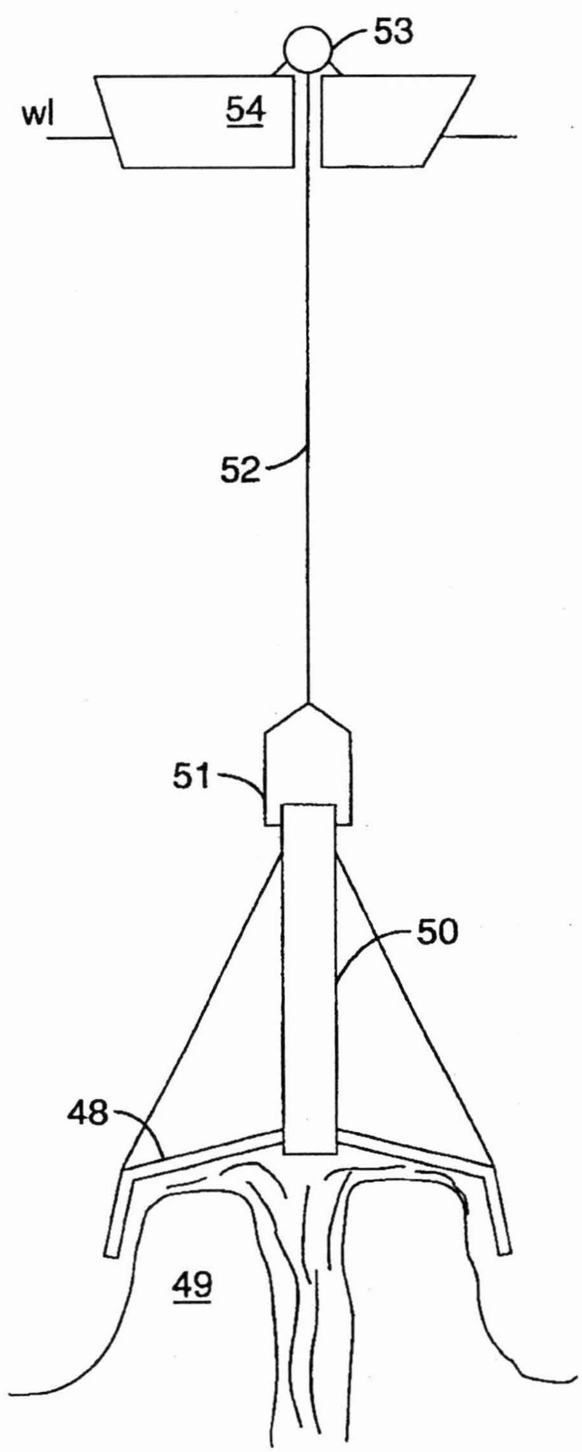


FIG. 9

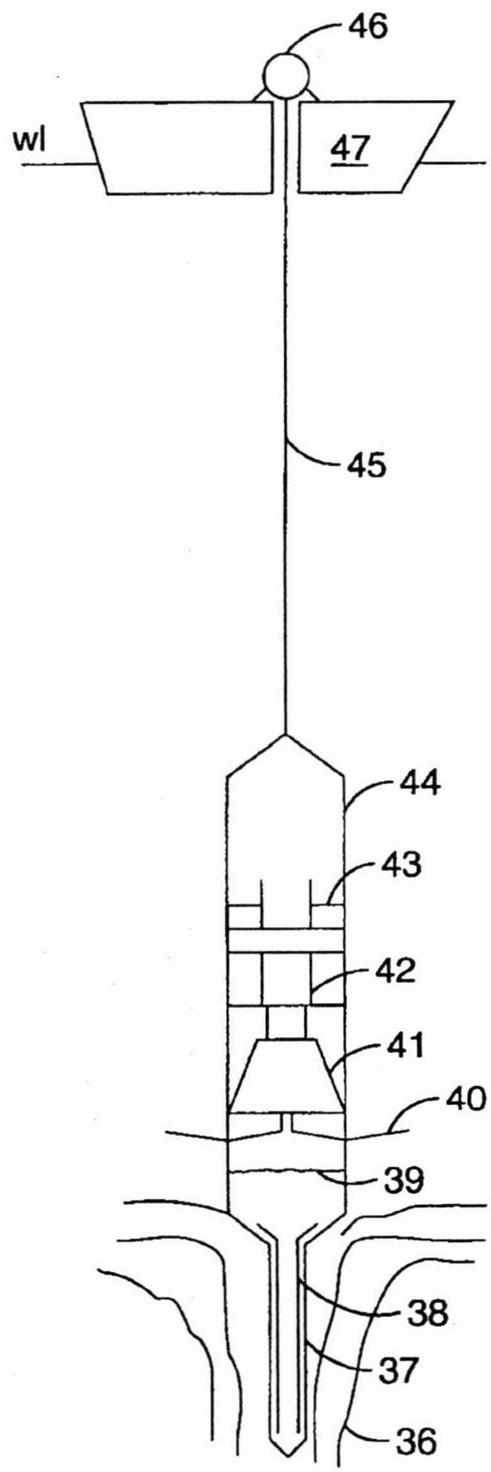


FIG. 10

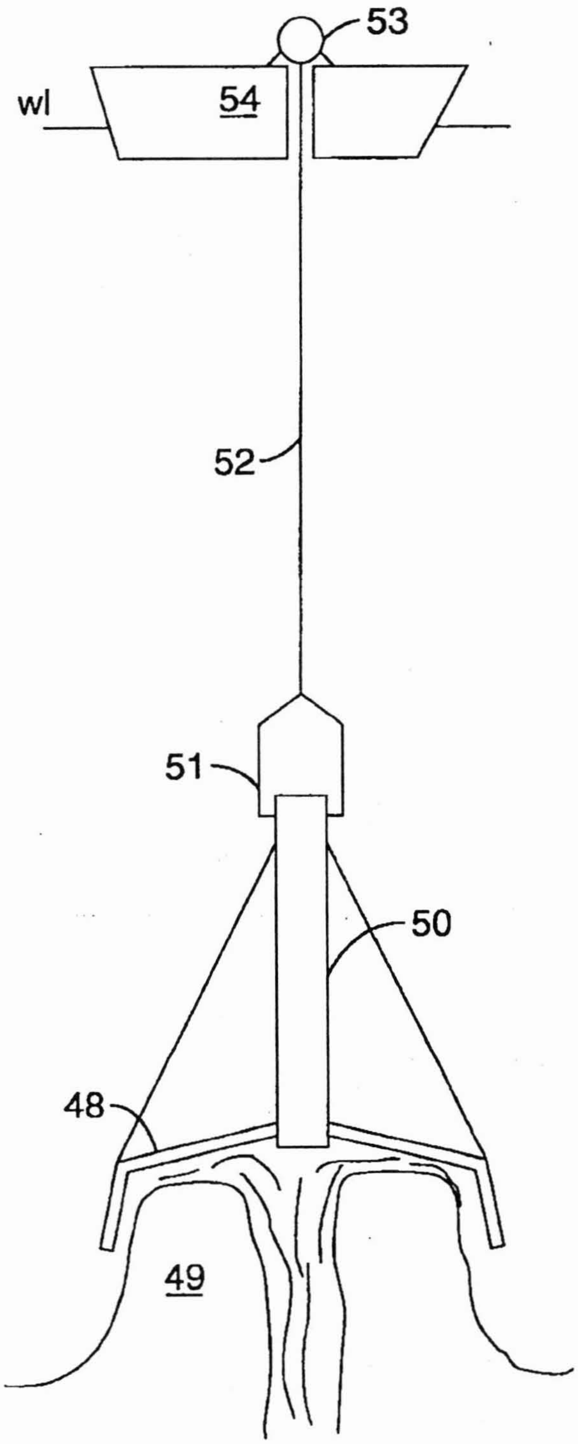


FIG. 9

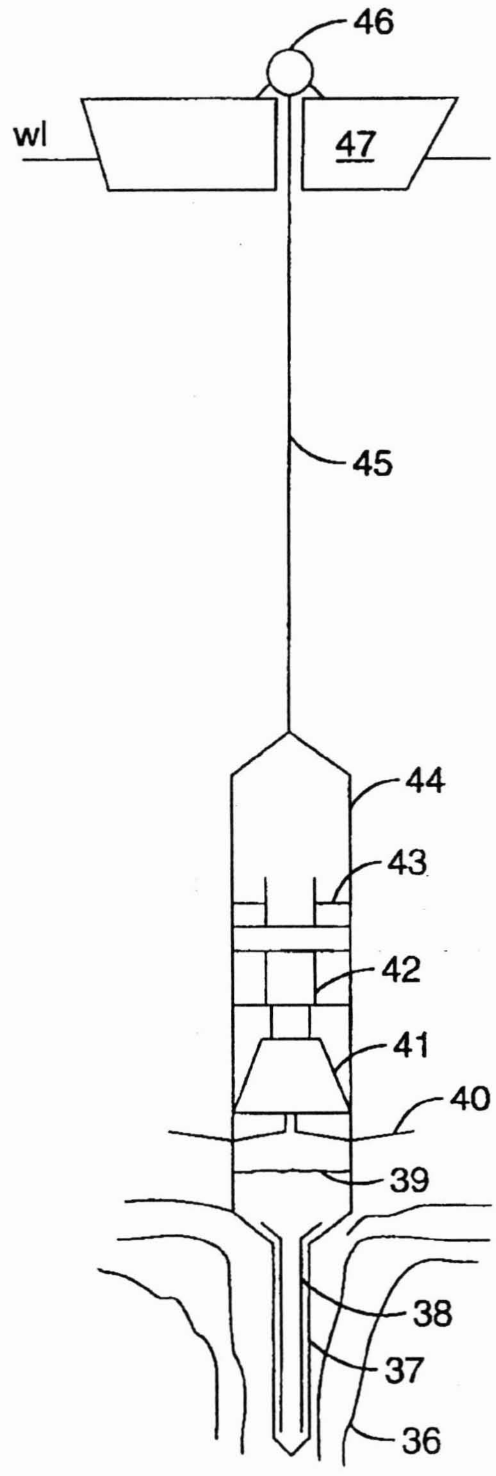


FIG. 10

METHOD OF MANUFACTURING A BUILDING MATERIAL FROM VOLCANIC MAGMA

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention pertains generally to building materials and their method of manufacture, and more particularly to using flowing volcanic magma to make structures and material that is ordinarily made of wood, brick, stone, steel, concrete, glass and other materials, as well as to generate electricity.

2. Description of the Background Art

In the past, structures have been made of wood, brick, stone, concrete, steel glass, plastic and other materials. Electricity has been generated by the use of geothermal, sun, nuclear and fossil fuel heat sources. Flowing volcanic magma is not known to have been used to produce building materials or electricity.

The main disadvantage of the prior materials and heat sources is the high cost to produce the raw materials, the refining costs plus transportation to manufacturing site. Geothermal heat depletes, the sun doesn't always shine, and nuclear plants have a special safety requirement cost.

Volcanic magma has been flowing almost continuously somewhere in the world from earliest times and will continue to do so for millennia to come. It is uncontrollable: nothing can stop it from erupting through the earth's surface. It has been useless at best and terribly destructive to life and property at its worst.

Therefore, there is a need for a method to tap flowing volcanic magma at low cost and to utilize this natural resource to produce many things, including electricity. The present invention satisfies that need, as well as others.

SUMMARY OF THE INVENTION

In accordance with the present invention, flowing volcanic magma is directed into molds or machinery in the fluid state to produce barges, wharves, breakwaters, fences, sound barriers, road paving, pipe, floors, walls, roofs, building block, structural foam, batt insulation, insulating board and fiber strand reinforcement for plastics, as well as used as a heat source for the generation of electricity.

A main advantage of this invention is that many products can now be made with little or no material cost.

Another advantage of this invention is that magma is stronger and more resistant to chemical attack than concrete.

An important advantage of this invention is that it can be used to generate electricity at very low cost.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be more fully understood by reference to the following drawings which are for illustrative purposes only, and where like reference numbers denote like parts:

FIG. **1** is a cross-sectional view of a magma casting facility according to the present invention.

FIG. **2** shows a perspective view of a dwelling constructed of precast parts made in the casting facility shown in FIG. **1**.

FIGS. **3** and **4** show cross-sectional views of the joints and fastenings in the dwelling shown in FIG. **2**.

FIGS. **5** through **8** show a sequence in cross-section of a barge construction method according to the invention.

FIG. **9** is a cross-sectional view showing a method of building a giant lava chimney over an underwater vent according to the invention.

FIG. **10** shows in cross-section an underwater generator according to the invention.

FIG. **11** shows views of a flowing volcanic magma heated vertical boiler according to the invention.

FIG. **12** is a cross-section of the flowing volcanic magma heated vertical boiler shown in FIG. **11** taken through line **12**—**12**.

DESCRIPTION OF PREFERRED EMBODIMENTS

Referring more specifically to the drawings, for illustrative purposes the present invention is embodied in the apparatus generally shown in FIG. **1** through FIG. **12**. It will be appreciated that the apparatus may vary as to configuration and as to details of the parts, and that the method may vary as to the specific steps and sequence, without departing from the basic concepts as disclosed herein.

FIG. **1** shows a flowing volcanic magma casting facility in cross-section. Flowing volcanic magma is gated down an insulated delivery tube **21** to trough **22** which is continuous along the top corner of ganged, inclined slab molds **23**. Molds **23** have water filled, hollow steel spacers between the faces of the slabs (not shown) to keep the steel from getting too hot and generate steam for additional use at the same time. Overhead traveling crane **24** inserts reinforcing, shuttering; helps close the molds; helps direct delivery tube **21**; opens molds and removes the precast units to storage.

FIG. **2** shows a perspective view of a dwelling constructed of precast panels made in the casting facility FIG. **1**. It is assembled from four floor slabs **25**; five wall slabs **26**, one beam **27** and eight roof slabs **28**. They are bolted at the joints as shown in FIGS. **3** and **4**.

FIG. **5** shows a cross section of a floating mold **29** that defines the deck **30**, sides **31** and ends (not shown) that is being filled with flowing volcanic magma. Reference number **32** indicates bulkheads (longitudinal and transverse).

FIG. **6** shows a cross-sectional view of the part **33** just cast in FIG. **5**. It is supported by trapped air.

FIG. **7** shows a cross-sectional view of a drydock **34** supporting part **33** by the deck overhang so that its skirts are above the floor of the drydock **34** and will be engaged by the closing pour.

FIG. **8** shows the completed barge **35** floated out of the drydock **34**.

FIG. **9** is a cross-sectional view showing a method of building a giant lava tube to the ocean surface and above from an underwater flowing volcanic magma vent. A steel slip form cap assembly **48** is lowered over the flowing volcanic magma vent **49**. The diameter of **48** is a function of the flowing volcanic magma flow rate and cooling rate. The flowing volcanic magma raises the cap and solidifies inside the perimeter where it is cold. The direction of growth can be changed by pulling up and sideways on riser **50** by use of the cable **52**, its winch **53** and using thrusters or anchors on vessel **54**. Flotation chamber **51** also helps hold the assembly upright.

When the lava tube has risen well above sea level, magma can be directed into molds and otherwise processed in various barges surrounding the magma chimney island.

FIG. **10** shows in cross-section, an underwater generator system. Volcanic magma is flowing from an underwater vent **36**. A coaxial boiler tube **37** is inserted into the magma. A propeller **38**, driven by the turbine **41** aids circulation of the boiler water. Just above the steam chest **39** is a collar **40** to limit penetration of the probe. The steam turbine **41** drives the generator **42** and the feed water trap **43** collects the condensate from the condenser **44**. A cable **45** and winch **46** on vessel **47** position the underwater generator. Power cables (not shown) could go ashore underwater.

FIG. **11** and FIG. **12** show a flowing volcanic magma heated vertical boiler that could be especially efficient where a good vertical drop is possible in the magma flow. Flowing volcanic magma enters at lava tube **52** and flows across and down through a grate of boiler header tubes **53** that are slightly larger in diameter and therefore closer together than the vertical boiler tubes **55**. Solids that cannot pass the grate **53** as well as excess magma flow will be forced through gate **54**. Boiler sides **56** can move in or out to help control flow and to allow access to the tubes. Circulation of water and steam to the steam chest **57** and heat transfer will be enhanced because this is a counter flow heat exchanger.

Accordingly, it can be seen that the present invention is directed to harnessing and using flowing volcanic magma in ways that have not been used before. Although the description above contains many specificities, these should not be construed as limiting the scope of the invention but as merely providing illustrations of some of the presently preferred embodiments of this invention. Thus the scope of this invention should be determined by the appended claims and their legal equivalents. Therefore, it will be appreciated that the scope of the present invention fully encompasses other embodiments which may become obvious to those skilled in the art, and that the scope of the present invention

is accordingly to be limited by nothing other than the appended claims, in which reference to an element in the singular is not intended to mean "one and only one" unless explicitly so stated, but rather "one or more." All structural, chemical, and functional equivalents to the elements of the above-described preferred embodiment that are known to those of ordinary skill in the art are expressly incorporated herein by reference and are intended to be encompassed by the present claims. Moreover, it is not necessary for a device or method to address each and every problem sought to be solved by the present invention, for it to be encompassed by the present claims. Furthermore, no element, component, or method step in the present disclosure is intended to be dedicated to the public regardless of whether the element, component, or method step is explicitly recited in the claims. No claim element herein is to be construed under the provisions of 35 U.S.C. 112, sixth paragraph, unless the element is expressly recited using the phrase "means for."

What is claimed is:

1. A method of manufacturing a building material, comprising:

directing molten volcanic magma from an underwater volcanic magma vent to a level above sea level via a tube formed from the magma;

directing the molten volcanic magma into a mold located on a floating barge;

cooling the magma in the mold to form a building material; and

removing the building material from the mold.

* * * * *

Prosecution of this patent is continuing with multiple claims pending concerning the use of magma obtained from land vents.