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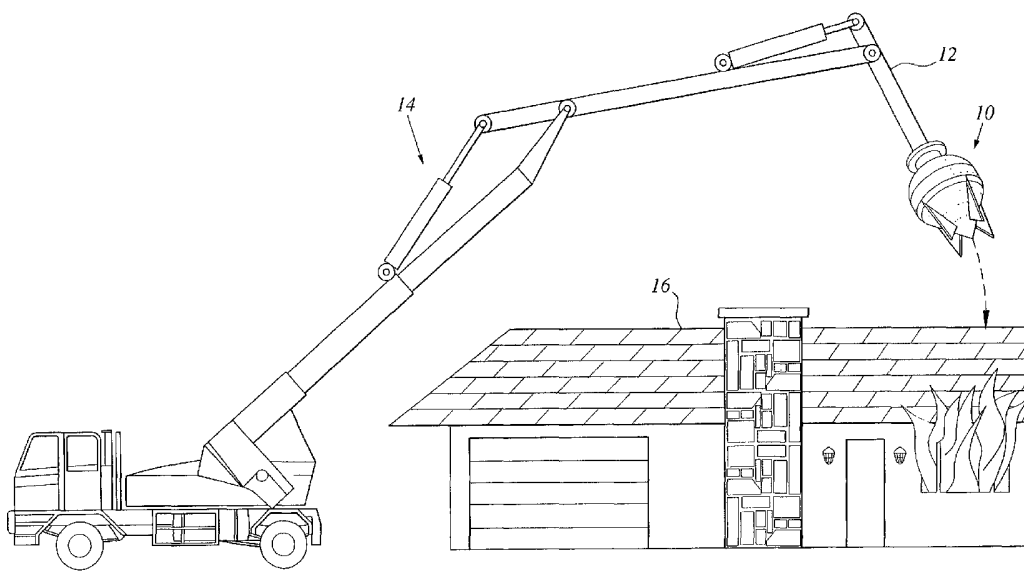
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(54) Title: APPARATUS AND METHOD FOR EXTINGUISHING FIRES



(57) Abstract: An apparatus and method for extinguishing a fire in a burning building includes a hollow, conically-shaped, hardened metallic device (10) attached to an articulating arm (12) of a boom (14). The device (10) is provided with plural nozzles (26) formed through its outer surface. The device (10) is impelled from the articulating arm (12) to impact and crash through the building adjacent the fire. Fire extinguishing fluids are supplied via the plural nozzles (26) to extinguish the fire.



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APPARATUS AND METHOD FOR EXTINGUISHING FIRES**TECHNICAL FIELD**

The present invention generally relates to fire fighting equipment. More specifically, the present invention is drawn to an apparatus and method for delivering fire extinguishing fluids to a burning structure.

BACKGROUND ART

One of the more difficult and dangerous functions of fire fighting requires that fire-fighting personnel manually utilize tools (axes, saws, mallets, etc.) to break through building roofs, barred windows or walls to reach the origin of the fire and apply extinguishing fluids to the fire. Many fatalities and injuries have occurred simply because the personnel are in such close proximity when roofs or walls collapse. Providing durable, rugged, reliable apparatus whereby this function may be accomplished remotely and efficiently would certainly decrease risks and increase effectiveness in fire fighting techniques.

There are many prior art devices which are employed to penetrate the walls of burning structures. For example, U.S. Patents numbered 2,857,005 (Medlock) and 5,301,756 (Relyea et al.) disclose tools designed to pierce an aircraft fuselage and deliver fire extinguishing fluids to the burning interiors of the aircraft. The tools of the instant patents appear to be too fragile to withstand the impact required to break through barred windows, re-enforced concrete walls or roofs of buildings.

U.S. Patents numbered 2,813,753 (Roberts), 4,802,535 (Bakke) and 5,839,664 (Relyea) show fire-fighting tools having pointed tips which

function to penetrate a wall of a building. The tips of the tools are designed to produce a relatively small opening and would only extinguish the fire at the inner surface of the penetrated wall.

U.S. Patent numbered 3,104,720 (Sullivan) requires firemen to be positioned closely adjacent a device, which device is employed to bore a hole through a roof to allow application of fire retardant materials.

U.S. Patent 5,788,158 (Relyea) discloses an automatic leveling device for a fluid nozzle mounted on the outer end of an aerial boom. No provision is made for the nozzle to penetrate the walls or roof of a building.

U.S. Patent numbered US 6,298,945 B1 (Anders et al.) shows a cone-shaped, roof-venting device mounted on an aerial extension ladder. The device is to be dropped on the roof of a burning building, thereby creating a hole in the roof. It is to be noted that the device does not provide for a continuous supply of fire extinguishing fluids to the fire.

None of the above inventions and patents, taken either singularly or in combination, is seen to disclose fire extinguishing method and apparatus as will be subsequently described and claimed in the instant invention.

DISCLOSURE OF THE INVENTION

The present invention is a device for extinguishing fires. The device includes an upper section, a middle section, and a lower section. The upper section has an upper end and a lower end. The lower section has a first end and a second end. The middle section interposes the upper section and the lower section. The middle section is attached to the lower end of the upper section and to the first end of the lower section. Exterior wall surfaces are defined by the upper

section, the middle section and the lower section. The exterior wall surfaces enclose an interior volume. The device has a plurality of apertures disposed through the exterior wall surfaces in each of the upper section, the middle section and the lower section. The apertures open into the interior volume. An array of cutter blades is positioned on and evenly spaced around the exterior wall surfaces of the lower section.

Also part of the invention is a fire extinguishing apparatus. The apparatus includes a boom having an articulated arm structure. A device for extinguishing fires is detachably mounted to the articulated arm structure. The device includes upper, lower, and middle sections, as described above. Exterior wall surfaces defined by the upper, middle, and lower sections enclose an interior volume. A plurality of apertures is disposed through the exterior wall surfaces and open into the interior volume. At least four cutter blades are positioned on and evenly spaced around the exterior wall surfaces of the lower section.

Also part of the invention is a method of extinguishing a fire in a burning building. The building has a roof and at least one wall. The method includes a step of providing a boom as described above. Another step is providing a conically-shaped member fabricated from hardened metallic material. The conically-shaped member has an exterior surface enclosing an interior volume. The exterior surface has a plurality of apertures communicating with the interior volume. Another step is removably attaching the conically-shaped member to the articulating arm structure. The conically-shaped member is impelled from the articulating arm such that the conically-shaped member impacts the burning building closely adjacent to the fire. Another step is continuously supplying a fire extinguishing fluid to the interior volume of the conically-shaped member. The fluid exits the interior volume via the plurality of apertures to extinguish the fire.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is an environmental, perspective view of a boom and extinguishing device according to the present invention.

Fig. 2 is a plan view of an extinguishing device according to the present invention.

Fig. 3 is a cross-sectional view of an extinguishing device according to the present invention.

Similar reference characters denote corresponding features consistently throughout the attached drawings.

BEST MODES FOR CARRYING OUT THE INVENTION

The present invention, to be dubbed "The Fifth Man" includes a cone-shaped device having an exterior surface which defines a hollow interior. The exterior surface is provided with a plurality of nozzles, which nozzles communicate with the hollow interior. The lower, tapered end of the device has an array of hardened cutter blades disposed there around. The upper end of the device has an entry opening adapted to receive the exit end of a standard fire hose or the like. The device is designed to be attached to a conventional articulating boom.

In use, the articulating boom impels the device forcefully against a roof or wall of a burning structure such as a house or apartment building. The hardened cutter blades function to create a hole in the structure, thereby permitting the device to be forced through the walls or roof. A fire-extinguishing fluid (water or foam) is supplied via the entry opening into the interior of the device. The fluid will exit the device through the plural nozzles to extinguish the fire. The

apparatus of the present invention is especially useful when fighting fires in multi-story structures. The above procedure is accomplished remotely without requiring that fire personnel be positioned in harm's way.

Attention is directed to Fig. 1 wherein the extinguishing device of the present invention is generally indicated at **10**. Device **10** is mounted at the end of the articulating arm **12** of the boom generally indicated at **14**. As stated above, boom **14** and arm **12** are conventional and are not, per se, a part of the inventive concept. Boom **14** is fitted with lines (not shown) to supply fire extinguishing fluids to device **10**. The boom can be equipped with a conventional hydraulic accumulator (not shown) which would function to forcefully impel device **10** from the boom against a wall or roof of a burning building **16**. The rugged device will create a hole in the wall or roof providing access to the fire. Fire-extinguishing fluids can be applied to the fire through apertures in the device as will be further explained below.

The structural make-up of device **10** is illustrated more clearly in Figs. 2 and 3. Device **10** is formed by an exterior surface having upper, middle and lower sections, which sections define walls enclosing an interior volume. The upper section is defined by a cap portion **20** of semi-hemispherical configuration. The upper end of cap **20** terminates in a flanged adapter **20a**. Adapter **20a** is sized to readily connect with the outlet of a fire hose or the like. A middle cylindrical section **22** is attached at one end to the lower end of cap section **20**. A conical lower section **24** is attached to the other end of section **24**. Lower section **24** terminates in a nose cone **24a**. Plural nozzles **26** are disposed through each of the sections and open into the interior volume. At least four cutter blades **28** are evenly spaced around lower section **24** and are attached thereto. The nozzle array in

section **20** is oriented to issue extinguishing fluids in a slightly upward direction. The nozzle array in section **22** issues fluids in a substantially horizontal direction. Fluids issue from section **26** in a downward direction. The varied nozzle orientation allows the issued extinguishing fluids to effectively attack the fire from multiple directions. All components of device **10** are fabricated from hardened metallic materials so as to present a rugged structure capable of withstanding the rigors of pounding against the walls and roofs of buildings and the attendant heat generated by the fire. The components are attached to each other by welds or the like.

The preferred embodiments of the invention provide a method and apparatus to enable fire fighters to effectively extinguish a fire from a remote position. The method and apparatus enable fire fighters to quickly and efficiently access a fire via the walls or roof of a burning structure. Fire fighters can also apply fire extinguishing fluids to the fire from a remote position.

It is to be understood that the present invention is not limited to the embodiment described above, but encompasses any and all embodiments within the scope of the following claims.

CLAIMS

I claim:

1. A device for extinguishing fires comprising:
 - an upper section, said upper section having an upper end and a lower end;
 - a lower section, said lower section having a first end and a second end;
 - a middle section, said middle section interposing said upper section and said lower section, said middle section attached to said lower end of said upper section and to said first end of said lower section;
 - exterior wall surfaces defined by said upper section, said middle section and said lower section, said exterior wall surfaces enclosing an interior volume;
 - a plurality of apertures disposed through said exterior wall surfaces in each of said upper section, said middle section and said lower section, said plurality of apertures opening into said interior volume; and
 - an array of cutter blades positioned on and evenly spaced around the exterior wall surfaces of said lower section.
2. A device as recited in claim 1, including a flanged adapter member, said flanged adapter member attached to said upper end of said upper section.
3. A device as recited in claim 2, wherein said upper section is of semi-hemispherical configuration.

4. A device as recited in claim 3, wherein said middle section is of cylindrical configuration.

5. A device as recited in claim 4, wherein said lower section is of conical configuration.

6. A device as recited in claim 5, wherein said second end of said lower section terminates in a solid nose cone.

7. A device as recited in claim 6, wherein said upper section said middle section, said lower section, said array of cutter blades and said nose cone are fabricated from hardened metallic material.

8. A device as recited in claim 7, wherein there are at least four cutter blades in said array of cutter blades.

9. A fire extinguishing apparatus comprising:
a boom, said boom having an articulated arm structure;
a device for extinguishing fires detachably mounted to said articulated arm structure, said device including;
an upper section, said upper section having an upper end and a lower end;
a lower section, said lower section having a first end and a second end;
a middle section, said middle section interposing said upper section and said lower section, said middle section attached to said lower end of said upper section and to said first end of said lower section;

exterior wall surfaces defined by said upper section, said middle section and said lower section, said exterior wall surfaces enclosing an interior volume;

a plurality of apertures disposed through said exterior wall surfaces and opening into said interior volume; and

at least four cutter blades positioned on and evenly spaced around the exterior wall surfaces of said lower section.

10. A fire extinguishing apparatus recited in claim 9, including a flanged adapter member, said flanged adapter member attached to said upper end of said upper section.

11. A fire extinguishing apparatus recited in claim 10, wherein said upper section is of semi-hemispherical configuration.

12. A fire extinguishing apparatus recited in claim 11, wherein said middle section is of cylindrical configuration.

13. A fire extinguishing apparatus recited in claim 12, wherein said lower section is of conical configuration and wherein said second end of said lower section terminates in a solid nose cone.

14. A fire extinguishing apparatus recited in claim 13, wherein said upper section said middle section, said lower section, said array of cutter blades and said nose cone are fabricated from hardened metallic material.

15. A method of extinguishing a fire in a burning building said building having a roof and at least one wall comprising the steps of:
providing a boom, said boom having an articulating arm structure;

providing a conically-shaped member fabricated from hardened metallic material, said conically-shaped member having an exterior surface enclosing an interior volume, said exterior surface having a plurality of apertures communicating with said interior volume;

removably attaching said conically-shaped member to said articulating arm structure;

impelling said conically-shaped member from said articulating arm such that said conically-shaped member impacts said burning building closely adjacent said fire; and

continuously supplying a fire extinguishing fluid to said interior volume of said conically-shaped member, whereby said fluid exits said interior volume via said plurality of apertures to extinguish said fire.

16. The method as recited in claim 15, wherein said conically-shaped member is impelled to impact said at least one wall of said burning building.

17. The method as recited in claim 15, wherein said conically-shaped member is impelled to impact said roof of said burning building.

18. The method as recited in claim 15, wherein said fire extinguishing fluid is water.

19. The method as recited in claim 15, wherein said fire extinguishing fluid is foam.

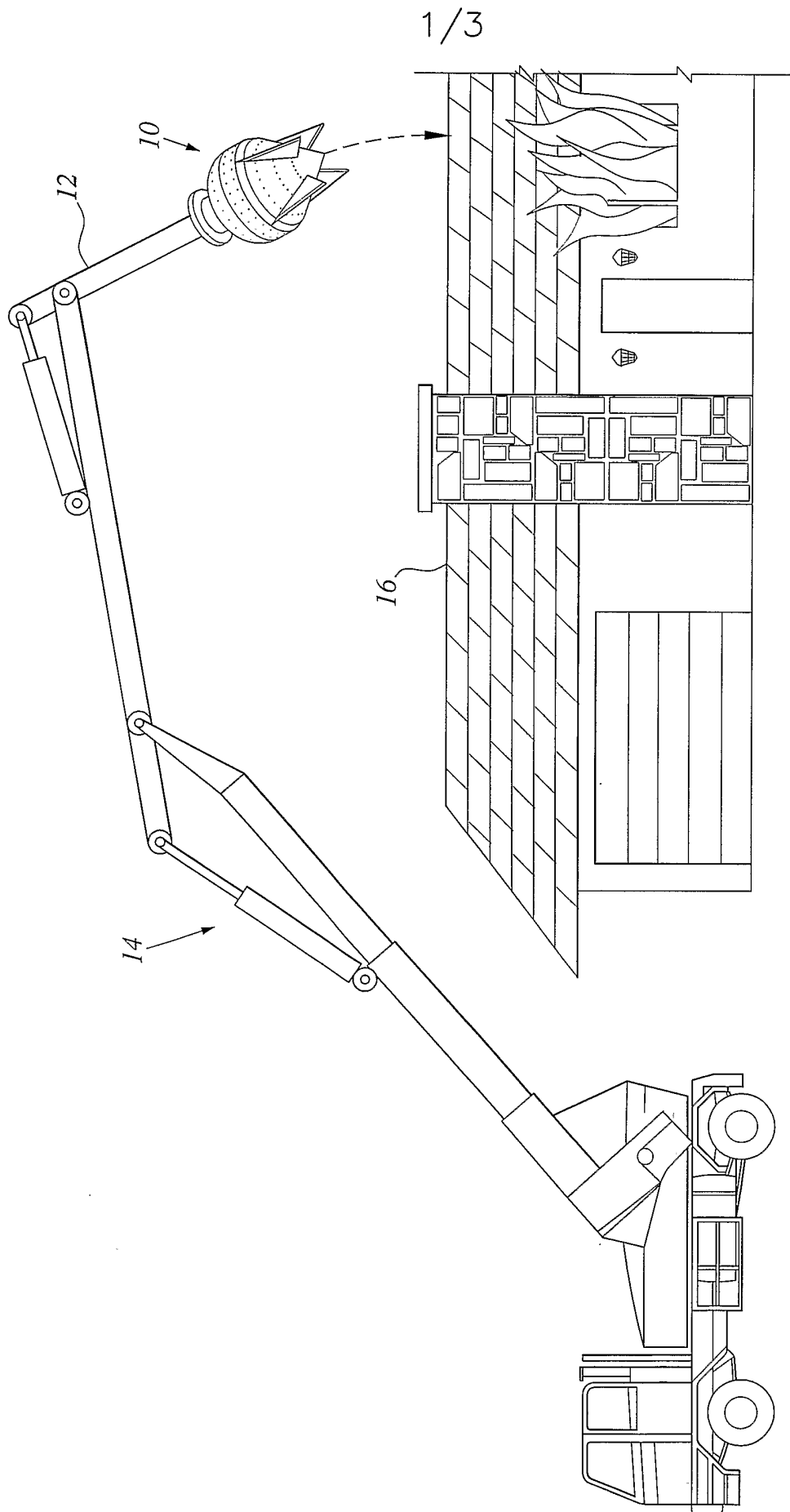


Fig. 1

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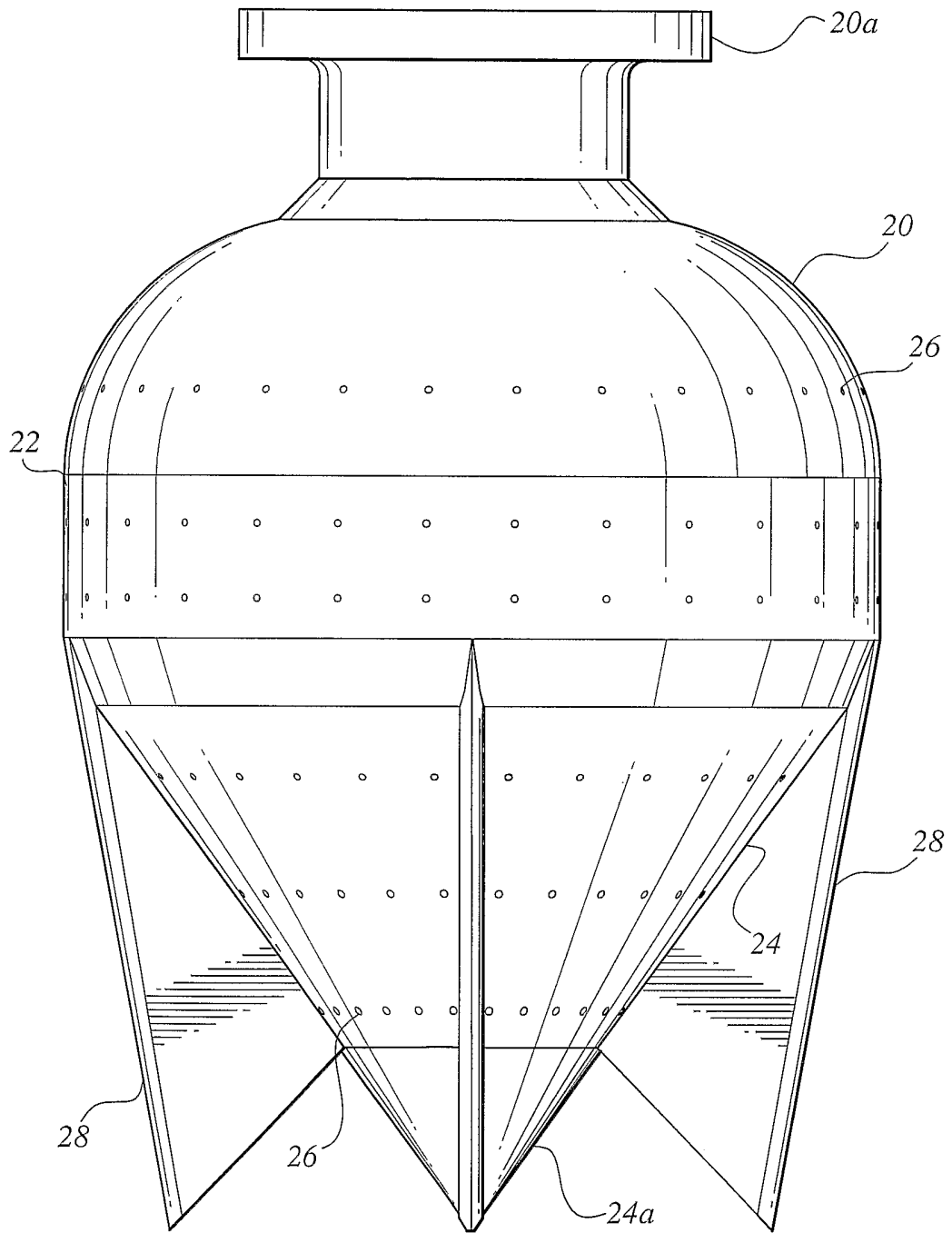


Fig. 2

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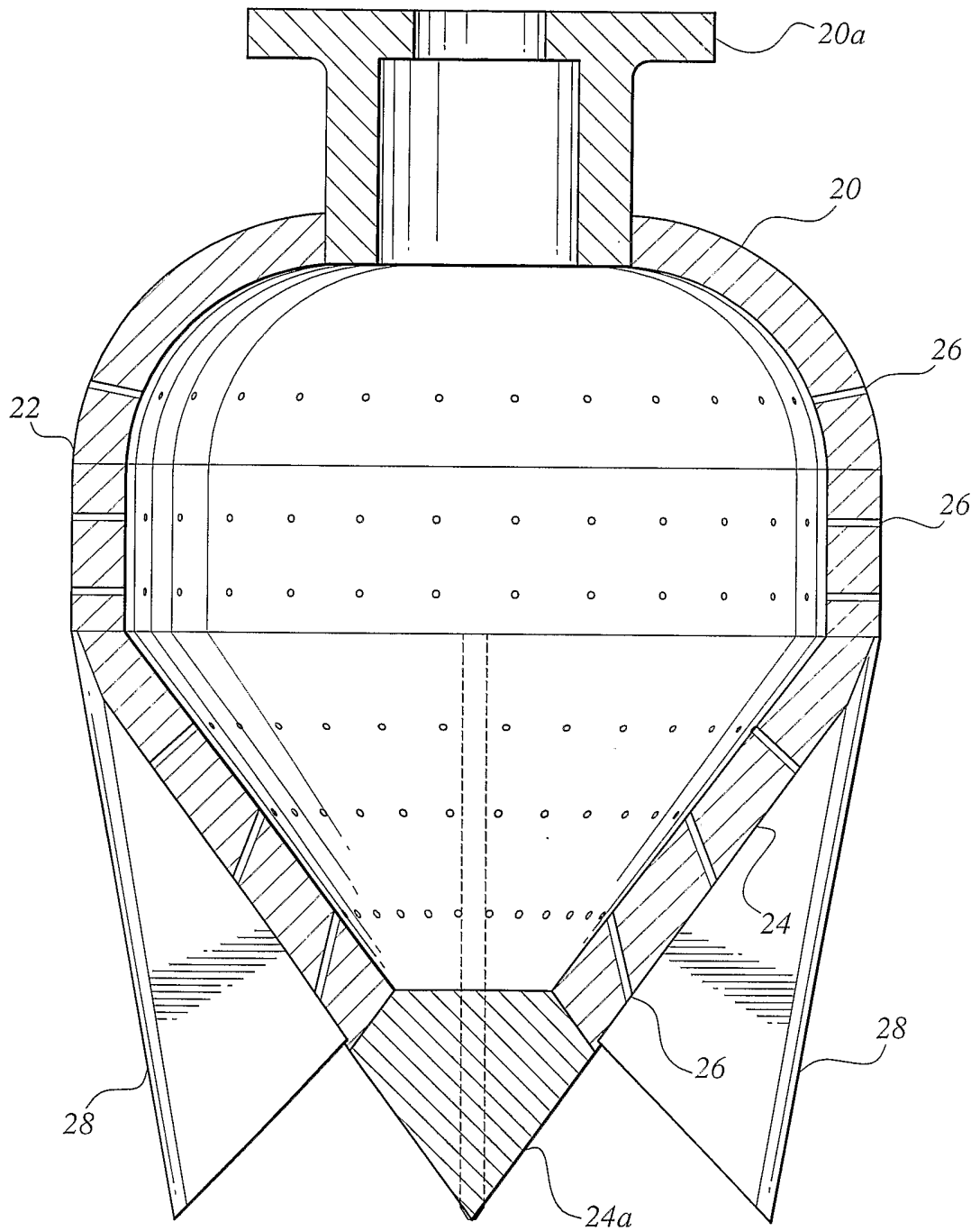


Fig. 3

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/01110

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : A62C 2/00, 27/00; B05B 1/20
 US CL : 169/24,43,47,52,54,70; 239/159,164,165,166,271

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
 U.S. : 169/24,43,47,52,54,70; 239/159,164,165,166,271

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,649,599 A (CATANESE, JR.) 22 July 1997 (22.07.1997), see entire document.	1-19
Y	US 4,676,319 A (CUTHBERTSON) 30 June 1987 (30.06.1987), see entire document.	1-19
Y	US 2,857,005 A (MEDLOCK) 21 October 1958 (21.10.1958), see entire document.	1-19
Y	US 2,413,083 A (SNOWDEN et al) 24 December 1946 (24.12.1946), see entire document.	1-19

Further documents are listed in the continuation of Box C. See patent family annex.

* Special categories of cited documents:		
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