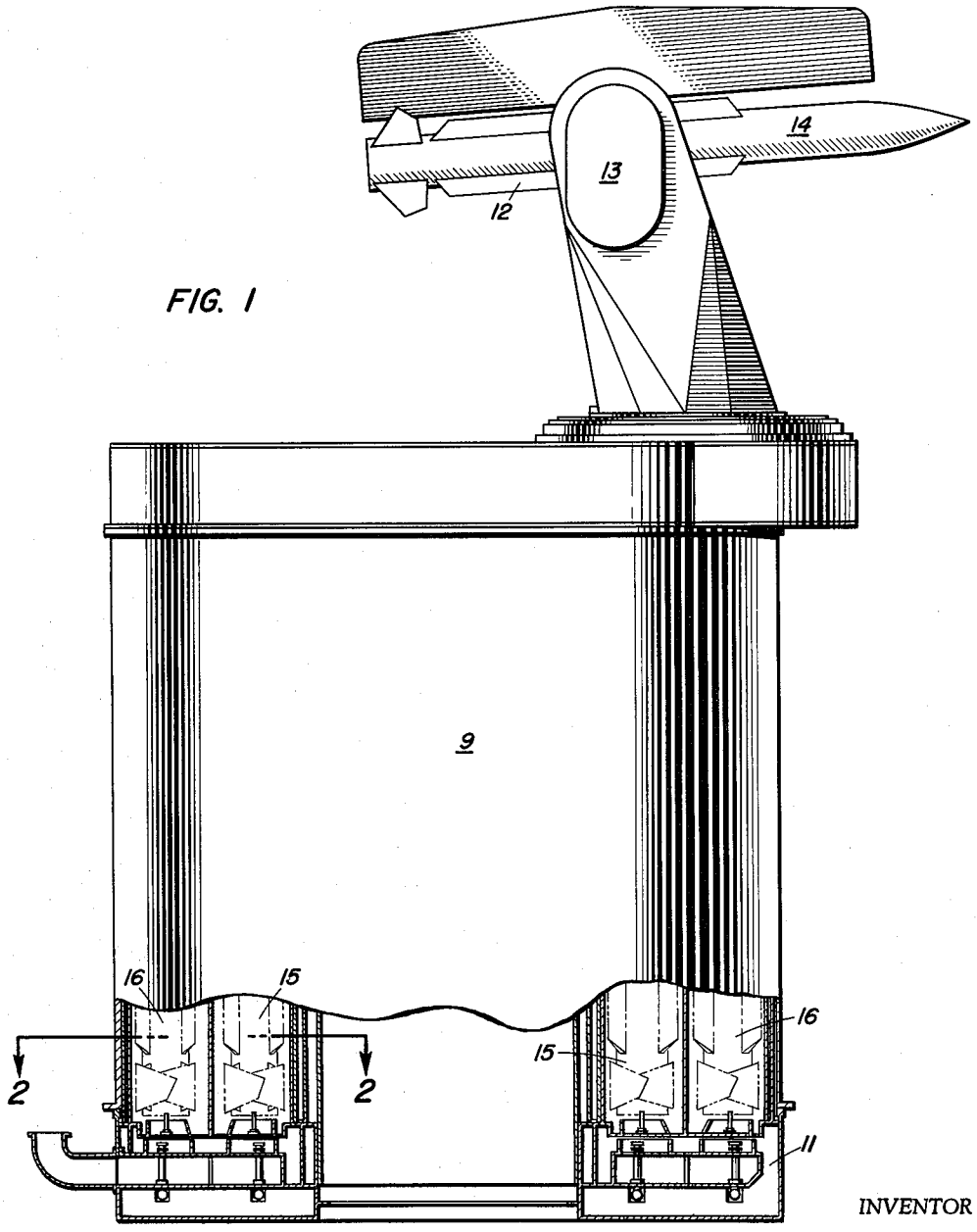
Jan. 11, 1966 M. C. NEUMAN ETAL 3,228,296

ARRANGEMENT FOR VENTING BLAST GASES AND FOR WATER INJECTION

Filed May 23, 1963 4 Sheets-Sheet 1

FIG. 1



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ARRANGEMENT FOR VENTING BLAST GASES AND FOR WATER INJECTION

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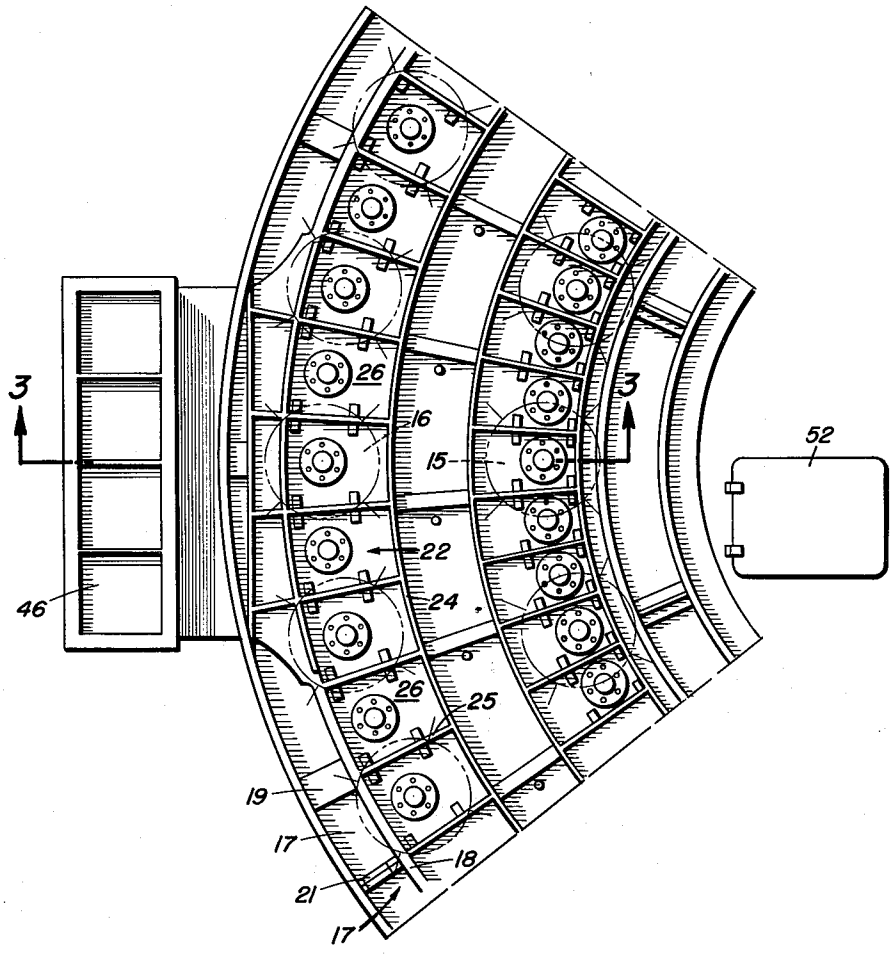
FIG. 2



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ARRANGEMENT FOR VENTING BLAST GASES AND FOR WATER INJECTION

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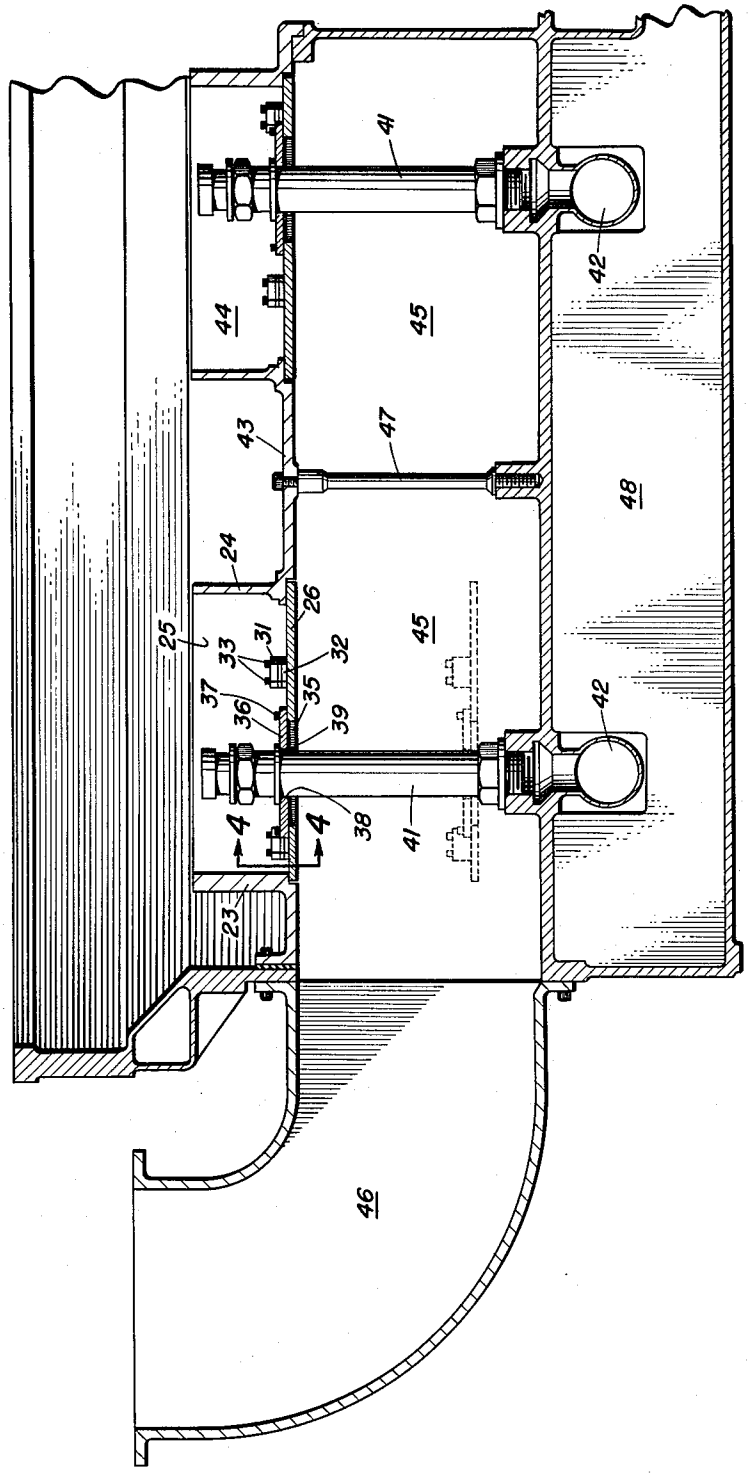
FIG. 3



ARRANGEMENT FOR VENTING BLAST GASES AND FOR WATER INJECTION

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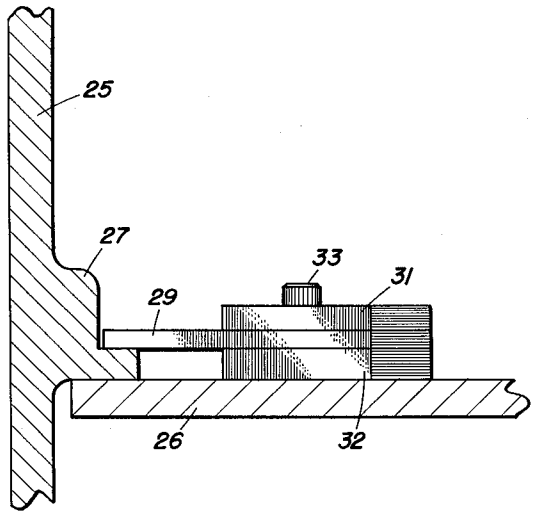

FIG. 4

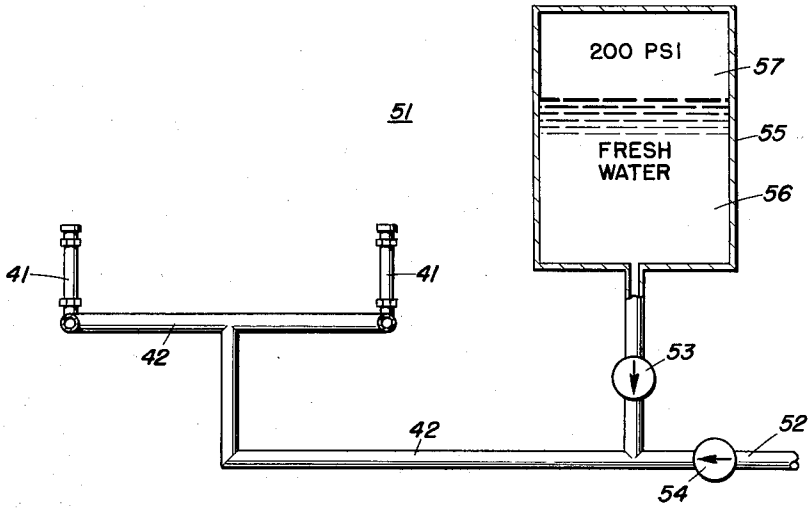

FIG. 5

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ARRANGEMENT FOR VENTING BLAST GASES AND FOR WATER INJECTION

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5 Claims. (Cl. 89—1.7)

This invention relates to a missile launching system having an attached magazine in which the missiles are stored in a vertical position in two concentric circles and particularly to that portion of the magazine serving as a support and base.

Certain safety features are necessary in a missile launching system to avoid mishaps due to fire, premature initiation of the missiles or to accidental or inadvertent ignition of the missile fuel or failure of some electrical, mechanical or hydraulic piece of equipment to operate in perfect order. The base of the magazine is in proximity to the exhaust end of the stored missiles and offers the best possible place to house automatic fire extinguishing equipment. The base of the magazine may also be formed with means for conducting exhaust gases beyond the magazine should there be preliminary ignition of any of the stored missiles.

The base of the magazine must be of solid rugged construction, strong enough to carry a large proportion of the weight of the entire launching system and to withstand the shock of take-off of the missiles from the launching arm. It must also house the particular mechanisms which by reason of their function are located below the missiles, when in their stored position. Such mechanisms generally are of the safety insurance type and while they have little function in the firing of the missiles, the system would not be complete without these safety devices.

It is therefore the object of this invention to provide a base for supporting the magazine and to house certain safety systems without which the launching system would be inadequate.

Another object of the present invention is to provide a multiplicity of separate compartments positioned so as to provide a multiplicity of compartments arranged in two concentric circles, underlying the path of the missiles and spaced so as to provide a single compartment directly under each individual missile during each step in the rotation of the missiles from any storage position to the position at which the missiles are loaded onto the launcher arm.

It is a further object to provide a duct system underlying the compartments and connected to some external gas exhausting means to provide a passageway for any gases which might be formed due to inadvertent or accidental ignition of the missile fuel.

It is a still further object to provide means associated with each compartment and normally separating these compartments from the duct system which may, by reason of its function, be rendered useless as a separating barrier and permit connection between one or more compartments and the duct system to permit any accumulation of gases within the compartment to be exhausted through the duct system.

It is a still further object to provide an automatic fire extinguishing system which will function under any or all necessary conditions, exhausting a supply of fresh water and later automatically connecting with a pressurized supply of sea water.

It is a still further object of this invention to provide a water injection nozzle, connected to the fire extinguishing system, in each compartment to operate automatically and singly to control any fire within that compartment.

Other objects, advantages and novel features of the invention will become apparent from the following detailed description of the invention when considered in conjunction with the accompanying drawings wherein:

FIG. 1 is a front elevation of the missile launching system with portions of the base of the magazine and the magazine broken away;

FIG. 2 is an enlarged view taken on line 2—2 of FIG. 1;

FIG. 3 is an enlarged view taken on line 3—3 of FIG. 2;

FIG. 4 is an enlarged view taken on line 4—4 of FIG. 3;

FIG. 5 is a diagrammatic view of part of the fire extinguishing system.

Referring more particularly to the drawings wherein like parts are referred to by like reference numerals, the magazine 9 of the missile launching system is shown mounted on a base 11. Actually the system extends through the deck of a ship and is supported by deck beams and other auxiliary supporting structure (not shown) which forms no part of this invention. The magazine supports a launching arm 12 carried on trunnion 13. The launching arm is elevated and trained to aim an arm supported missile 14 and which after firing of the missile is moved to a vertical position to receive another missile from the magazine.

These missiles are stored in inner and outer concentric circular compartmented structures, representatives of each being illustrated at 15 and 16 respectively. The magazine, above the base is rotated to bring the missile, in turn to a launcher arm loading position.

Referring particularly to FIG. 2 which shows a top plan of a quarter section of the base and which will be described as though the entire round base were shown, a cylindrical outer wall 17 comprises two semi-circular sections having an outer wall 17 and an inner wall 18 braced by radial partitions 19 at intervals. The semi-circular sections are joined together at 21 and at a corresponding diametrical opposite point to form a substantial outer wall, hereinafter referred to as 17.

Located adjacent the outer wall 17 a plurality of similar shallow compartments 22 are arranged in a circle concentric with the wall and immediately under the outer circle of compartments storing the vertical missiles. Each of these shallow compartments 22 are formed with outer and inner arcuate walls, 23 and 24 respectively, radial side walls 25 and a bottom plate 26. The side walls 25 are each formed with a pair of inwardly extending projections 27 (FIG. 4) to receive a bottom plate holding member.

The bottom plate 26 is formed to underlie the outer and inner walls and the radial side walls, resting against a shoulder 28 (FIG. 3) following the configuration of the compartment to provide a tightly fitting yet removable bottom section.

The bottom plate is securely held by four resilient plates 29 (FIG. 4) each engaging one of the projections 27 of the radial side walls 26. These plates 29 are held in position by upper clamping plate 31 being tightened against lower clamping plate 32 by a pair of screws 33. Adjustment as to actuating blow-out pressure may be held by using resilient plates of different thickness to give greater or less resiliency.

The bottom plate 26 is designed to blow-out with a force or pressure on its upper surface so calculated that inadvertent or accidental initiation of the missile or ignition of the missile fuel creating a blast of exhaust gases into the compartment directly below the missile will exert sufficient pressure on the upper surface of the

bottom plate **26** to cause the resilient plate to flex and release the plate **26**.

The bottom plate **26** is further formed with a substantially centrally disposed cut-out portion **35** covered by a circular plate **36** which is secured to plate **26** by bolts **37**. The plate **36** has a central opening **38**, the edges of which are rounded as shown at **39** to prevent binding of the bottom plate during the blow-out operation.

Mounted within and lightly engaging the rounded edges of the central opening of plate **36** is a water injection nozzle **41** connected directly to a fire extinguishing system through pipe **42**. This nozzle is generally similar to the nozzle set forth in U.S. Patent 3,001,586 and accordingly the details are not described or claimed as part of this invention. It operates automatically to discharge water under pressure directly into the burning missile to provide the ultimate in fire prevention upon ignition of the missile fuel while the missile is in stored position.

Spaced from the outer circle of compartments by a circular spacing plate **43** is an inner circle of shallow compartments **44**. These shallow compartments are similar to those of the outer circle in all particulars and are arranged so as to be directly below the stored missiles of the inner circle.

The base is further formed below the compartments with a circular chamber **45** forming a duct adapted to be connected with any one or more compartments through blow-out of the bottom plate, to receive exhaust gases and to conduct the exhaust gases to an exit pipe **46** which may be connected to a ship's exhaust pump (not shown). Braces **47** located at various points serve to strengthen and support the duct structure.

Below the exhaust ducts a space **48** serves to house electrical wiring, the pipes for the fire extinguishing system and other service items.

The fire extinguishing system has a control unit **51** connected to pipe **42** and to a supply **52** of sea water under pressure through check valves **53** and **54** respectively. The control unit comprises a tank **55** partly filled with fresh water **56** and having air under pressure of 200 p.s.i. as shown at **57**. A small fire will be taken care of by the fresh water in the tank .

Inwardly of the inner circle of shallow compartments, the base is formed of an inner wall structure **51** similar to the outer wall **17** which gives strength to support the inner cylinder of the magazine and the inner circle of missiles. Centrally located in the base and below the inner cylinder a space has a bottom floor having a flame proof hatch **52** which gives access to the inside of the inner cylinder.

What is claimed is:

1. In a missile launching system having a magazine, a magazine base comprising:

a cylindrical housing closed at its bottom end;

a plurality of shallow compartments arranged in two concentric circles within said cylindrical housing;

chambers formed beneath each circle of compartments;

a separate bottom plate in each of said shallow compartments separating the compartments of each circle from the chambers located below the circles;

resilient means carried by each of the plates engaging the sides of the compartments to normally support the bottom plate as part of the compartment, said resilient means releasing the bottom plate from its compartment upon the application of force on the upper side of the bottom plate; and

an injection nozzle mounted centrally on each of the bottom plates of the compartments.

2. In a missile launching system having a magazine base comprising:

a cylindrical housing closed at its bottom end;

a plurality of shallow compartments arranged in two concentric circles within said cylindrical housing;

chambers formed beneath each circle of compartments;

a separate bottom plate in each of said shallow compartments separating the compartments of each circle from the chambers located below the circles;

resilient means carried by each of the plates engaging the sides of the compartments to normally support the bottom plate as part of the compartment, said resilient means releasing the bottom plate from its compartment upon the application of force on the upper side of the bottom plate; and

an injection nozzle mounted independently and centrally on the bottom plate of each of the compartments, whereby movement of the bottom plate will not disturb the injection nozzle.

3. In a missile launching system having a magazine for storing missiles in a vertical position, a magazine base comprising:

a cylindrical housing having a bottom;

a plurality of shallow compartments arranged in two concentric circles within said housing, said compartments being directly below stored missiles;

a separable bottom plate in each of said shallow compartments;

resilient means carried by the bottom plate and engaging the sides of the shallow compartment to normally hold the bottom plate in position, said means upon the application of force to the upper side of the bottom plate releasing the bottom plate;

an exhaust chamber located below said compartments, said chamber receiving the contents of said compartment upon release of said bottom plate; and

a water injection nozzle supported substantially centrally on each of said compartments.

4. In a missile launching system having a magazine for storing missiles in a vertical position, a magazine base comprising:

a cylindrical housing having a bottom;

a plurality of shallow compartments arranged in two concentric circles within said housing, said compartments being directly below said stored missiles;

a separable bottom plate in each of said shallow compartments;

resilient means carried by the bottom plate and engaging the sides of the shallow compartment to normally hold the bottom plate in position, said means upon the application of force to the upper side of the bottom plate releasing the bottom plate;

a water injection nozzle supported substantially centrally on each of said compartments; and

a fire extinguishing system connected to said nozzle.

5. In a missile launching system having a magazine for storing missiles in a vertical position, a magazine base comprising:

a cylindrical housing having a bottom;

a plurality of shallow compartments arranged in two concentric circles within said housing, said compartments being directly below said stored missiles;

a separable bottom plate in each of said shallow compartments;

resilient means carried by the bottom plate and engaging the sides of the shallow compartment to normally hold the bottom plate in position, said means upon the application of force to the upper side of the bottom plate releasing the bottom plate;

an exhaust chamber located below said compartments, said chamber receiving the contents of said compartment upon release of said bottom plate;

a water injection nozzle supported substantially centrally on each of said compartments;

a fire extinguishing system connected to said nozzle, said fire extinguishing system comprising;

a tank partially filled with fresh water under pressure;

a supply of sea water under a pressure lower than that of the fresh water;

water lines connecting said fresh water tank and said sea water supply to said nozzles; and

pressure actuated check valves in said lines to supply first the fresh water and later the sea water to the nozzles.

References Cited by the Examiner

UNITED STATES PATENTS

2,051,103	8/1936	Pohlman	169—5
2,445,423	7/1948	Eastman	89—1.7
3,001,586	9/1961	Kyle	169—2
3,052,303	9/1962	Lapp	169—2
3,065,673	11/1962	Hereth	89—1.7
3,089,390	5/1963	Wilson	89—1.7

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