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GUN PORT SHIELD

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FIG. 1

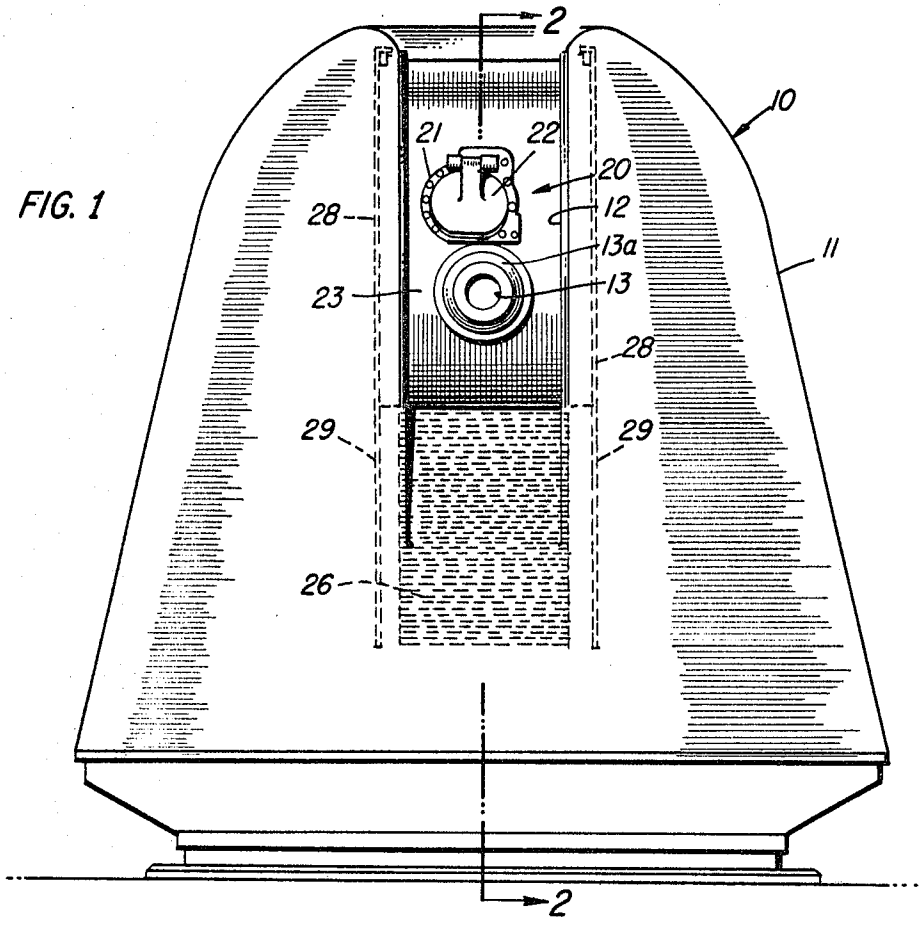
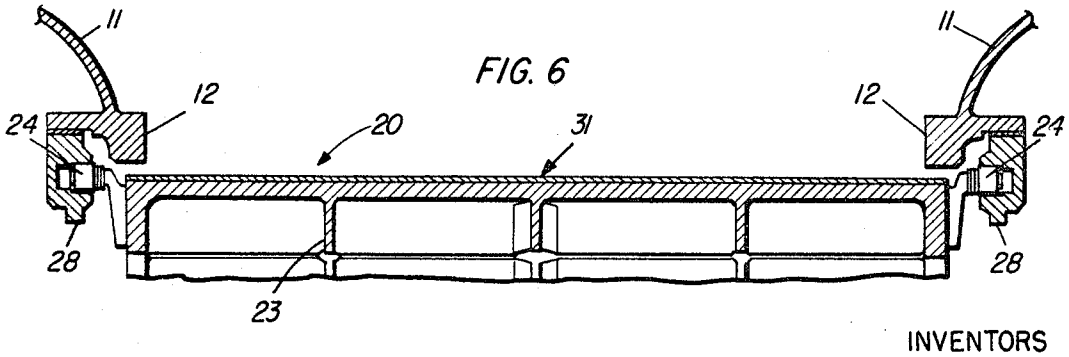


FIG. 6



INVENTORS

EDWARD R. BETZOLD

WILLIAM M. MAGERS

BY Arthur L. Branning ATTORNEY

Lawrence P. Rabanovic AGENT

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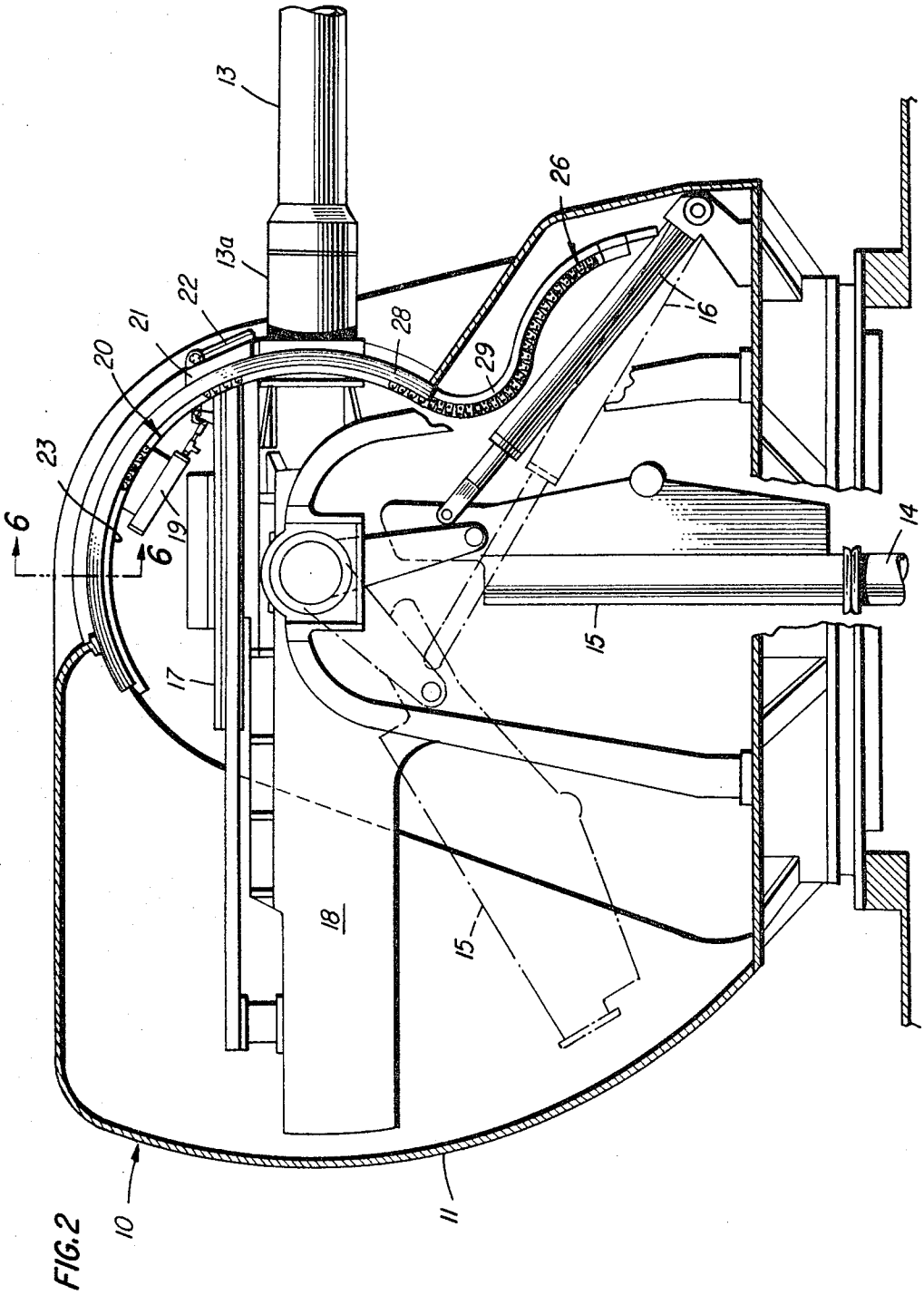


FIG. 2

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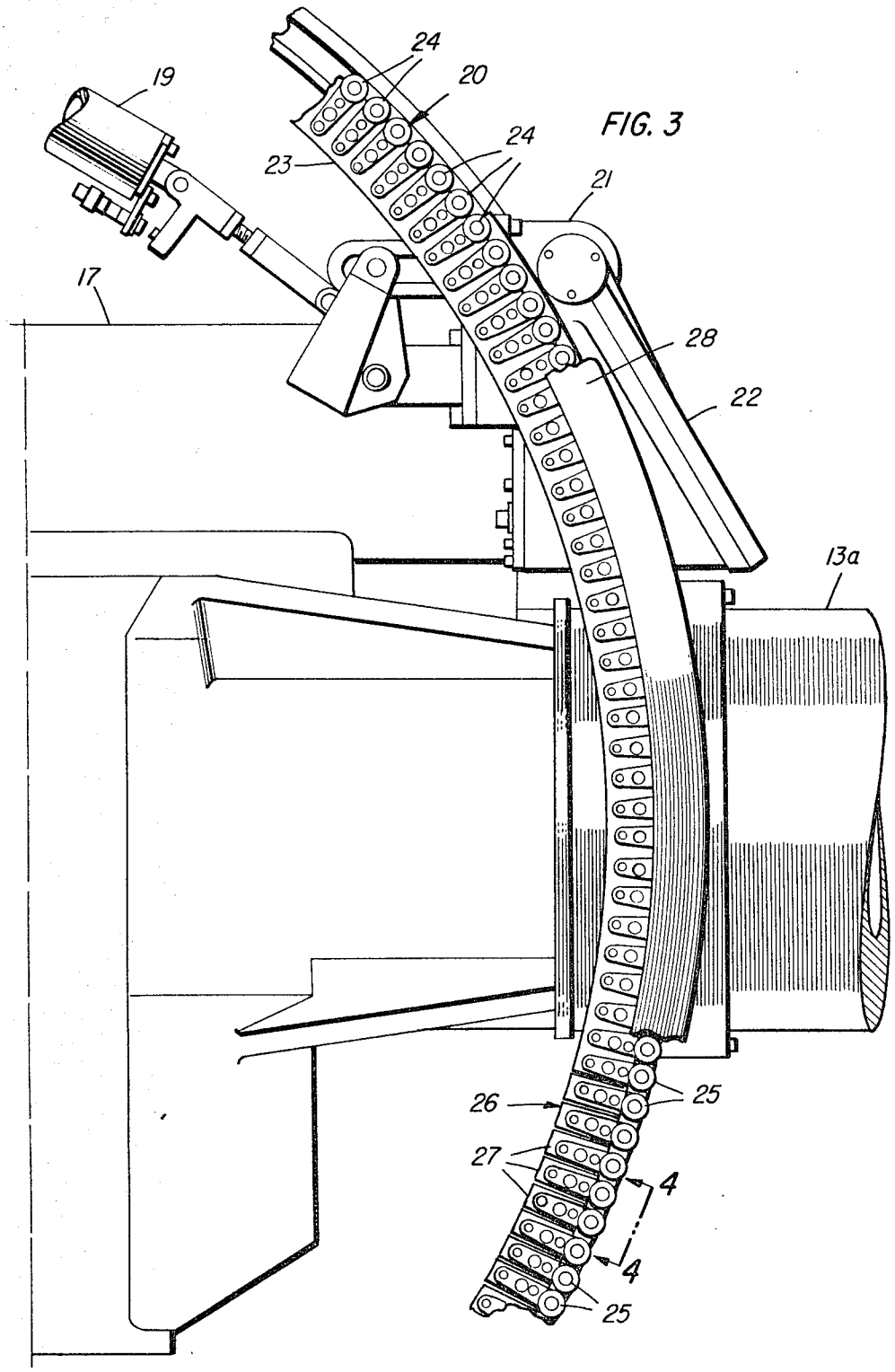


FIG. 3

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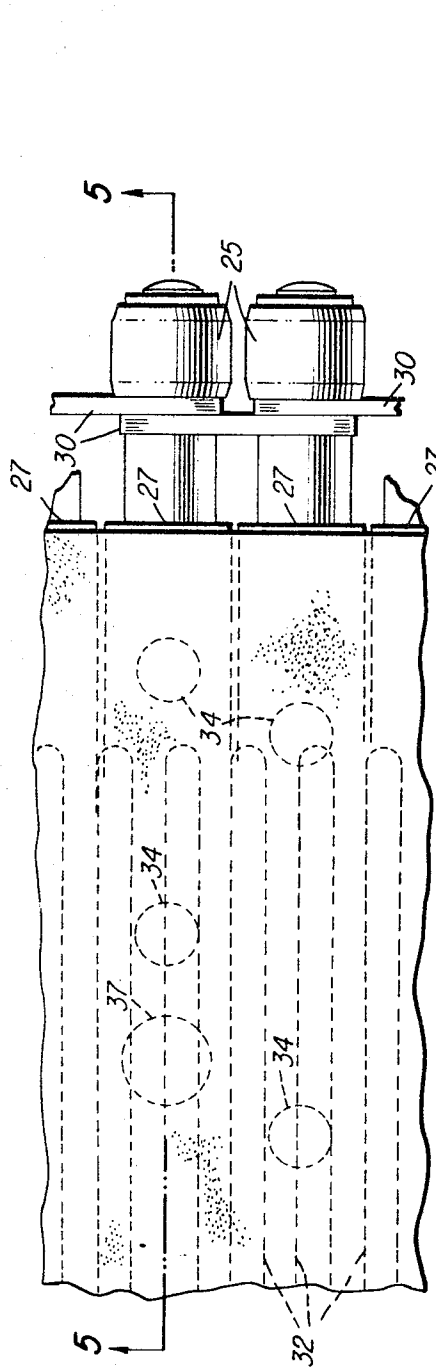


FIG. 4

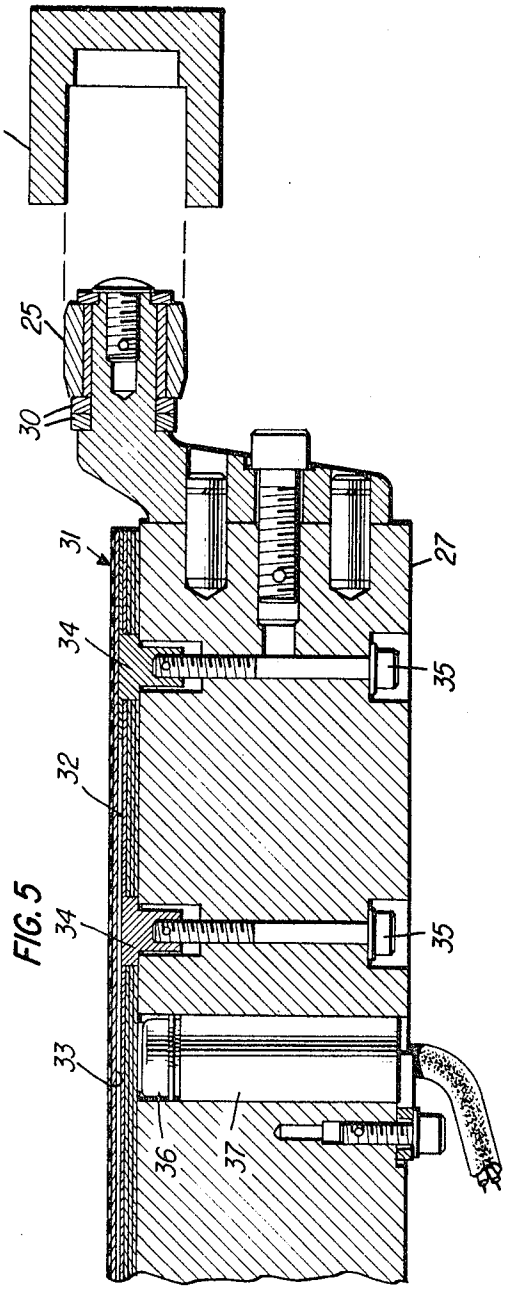


FIG. 5

United States Patent Office 3,453,929
Patented July 8, 1969

3,453,929

GUN PORT SHIELD

Edward R. Betzold and William M. Magers, Minneapolis, Minn., assignors, by mesne assignments, to the United States of America as represented by the Secretary of the Navy

Filed Aug. 11, 1966, Ser. No. 572,168
Int. Cl. F41h 5/00
U.S. Cl. 89—36 7 Claims

ABSTRACT OF THE DISCLOSURE

A gun port shield for a major caliber gun for the prevention of water and debris entering the gun and including means for preventing the formation of ice on the shield.

The present invention relates generally to major caliber guns with calibers in the order of magnitude of five inches or greater employing separate or semi-fixed ammunition and intended to be effective for both anti-aircraft and surface fire. More particularly, the present invention relates to a means for effectively sealing the gun port opening in the gun housing through which the gun barrel protrudes.

The gun housing or stationary shield for the major caliber gun is normally provided with an elongated gun port or opening through which the gun barrel and its associated barrel housing protrudes. The opening is designed to permit the gun to move through its extreme angles of elevation and depression about its elevation axis. Many gun housing designs are provided with a rigid gun port shield for spanning the opening over the full range of elevation in order to prevent water and debris from entering into the interior of the gun housing. Most of these designs, however, fail to recognize the problem of the gun port shield freezing in low temperatures, thereby reducing the operating efficiency of the gun during elevation and depression. Means have been heretofore provided for preventing an objectionable accumulation of ice on the gun port shield but such means are inefficient and cumbersome because they normally employ fluid as the medium for de-icing the shield which fluid requires extensive operating equipment for heating and circulation. Besides, should the need for a flexible or partially flexible shield arise, most existing defrosting systems for rigid shields are incapable of sufficiently de-icing a shield which must flex to a specified degree.

Accordingly, it is an object of the present invention to provide a gun port shield whereby the entrance of water and debris through the gun port is prevented without the shield interfering with other operating equipment for the proper manipulation of the gun.

Another object of the present invention is to provide a partially flexible gun port shield having means for preventing the formation of ice thereon.

A further object of the present invention is to provide a gun port shield wherein the anti-icing means thereon includes an electric blanket with heating elements therein.

Other objects, advantages and novel features of the present 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 elevational view of a gun mount in which the invention may be used;

FIG. 2 is a sectional view taken at line 2—2 of FIG. 1;

FIG. 3 is a view similar to FIG. 2 greatly enlarged showing only that part of the gun system relating to the invention;

FIG. 4 is a view taken at line 4—4 of FIG. 3 showing a part of the flexible portion of the gun port shield;

FIG. 5 is a view taken at line 5—5 of FIG. 4; and

FIG. 6 is a sectional view taken at line 6—6 of FIG. 2.

In the drawings, a gun mount **10** is shown mounted on a suitable gun support or gun deck and having a gun mount shield **11** enclosing the system's operating equipment. Shield **11** is provided with an elongated opening or gun port **12** which permits the gun barrel **13** and its associated housing **13***a* protruding therethrough to move through its extreme angles of elevation and depression about its elevation axis. Spanning opening **12** and surrounding the gun barrel is a gun port shield assembly **20** to which the present invention is specifically directed. Shield **20** is provided with a cover **22** and a suitably attached sleeve **21** for purposes to be hereinafter described.

In FIG. 2 of the drawings, a ready service hoist tube **14** receives ammunition from a ready service magazine therebelow, not shown, and feeds the ammunition rounds upwards through a combination ammunition cradle and ramming tray **15** which in turn swings upwardly about the gun's elevation axis to a position for ramming the shell into the breech block for firing. A cradle cylinder **16** hydraulically moves cradle **15** upwardly, one position of such movement being shown in phantom. An empty case ejector or chute **17** is secured to the top of slide assembly **18** so as to move with the gun barrel about the elevation axis **19**. One end of chute **17** is in alignment with an empty case tray, not shown, which receives the spent cartridges at the aft face of the gun bore and moves to a position for ejection. The other end of chute **17** extends to the outside of the gun shielding **11** through an aperture, just above the shield opening for the gun barrel, in gun port shield assembly **20** normally closed by cover sleeve **21** and cover **22**. The empty powder cans are therefore ejected from the gun via chute **17** after the door or cover **22** is opened by means of a hydraulic cylinder **19** though a series of interlock valves during the course of the firing operation.

In the drawings, an arc-like rigid portion **23** comprises a section of shield assembly **20** extending from just below barrel **13** and through an arc of approximately 145° about the elevation axis. The remaining section of shield assembly **20** consists of a flexible portion **26** which, together with portion **23**, has sufficient strength to resist the impact of ocean wave action and muzzle blast.

A weather facing **31** covers both the rigid and flexible portions of shield assembly **20**. Since the gun must operate under weather conditions including temperatures to —20° F. and winds up to 40 knots, facing **31** must provide sufficient heat to prevent the formation of ice on its sealing surface.

Portion **23** of the shield is a one-piece arc of cast aluminum or other suitable material having therein an aperture through which the gun barrel means **13** projects and another opening through which one end of chute **17** extends. Rollers **24** are mounted along its side edges and are of a conventional design similar to rollers **25** shown in FIGS. 4 and 5. These rollers are guided in arc-shaped tracks **28**, U-shaped in cross-section, which are rigidly fixed to the inside of stationary shield **11** along the sides of the gun port opening **12**. The aforementioned cover sleeve **21** and its hingedly attached cover **22** is also secured to the outer face of rigid portion **23**.

Flexible portion **26** consists of a plurality of support bars **27** of a metal similar to that of rigid portion **23**. As shown in FIGS. 4 and 5, a roller **25** is secured in the conventional manner to each end of these bars for slidably supporting them in tracks **29**, FIG. 2, rigidly fixed to the inside of shield **11** in end-to-end alignment with tracks **28**. Each support bar **27** is connected to its adjacent bar by means of links **30** thus forming a flexible assembly of support bars. Tracks **29**, U-shaped in cross-section, are similar to tracks **28** except that tracks **28**

guide rigid portion **23** about the elevation axis of the gun while tracks **29** guide the flexible portion **26** away from the elevation axis, as shown in FIG. 2, in order to prevent interference with operating equipment such as cradle **15**, cradle cylinder **16** and its cradle power drive.

From the foregoing, it then becomes apparent that tracks **28** act to slidably support both rigid portion **23** and flexible portion **26** when the gun barrel **13** is elevated from zero or its horizontal position through to its position of maximum elevation.

Flexible portion **26** is linked to rigid portion **23**, in the same manner as support bars **27** are interlinked, so as to form a single unit which is elevated or depressed by gun barrel **13** and its housing **13***a* projecting through the rigid portion **23** of the gun port shield **11**.

The weather facing **31** of the gun port shield is substantially of the same width as each of portions **23** and **26**. The facing is sufficiently long to cover the entire length of portions **23** and **26** interlinked together. It consists of a plurality of heating elements **32** disposed and laminated between sheets of synthetic rubber **33** such as neoprene, shown in FIG. 5 of the drawings. The outer surface of facing or blanket **31** is faced with a coating of Teflon or its equivalent. Imbedded or otherwise secured to the inner face of the rubber **33** and projecting therethrough is a series of tapped buttons **34**. These buttons are arranged in rows to coincide with the spacing of support bars **27** in flexible portion **26** of the gun port shield as shown in FIG. 4 so as to facilitate attachment of weather facing **31** to the support bars by means of cap screws **35**. The remainder of weather facing **31** is cemented or otherwise secured to rigid portion **23** of the gun port shield thus forming a flexible, anti-iced gun port shield **20**.

Heating wires **32** are connected to a suitable electric power source which is regulated by thermostats **36** in conjunction with 440 v. AC relays. The total heating element **32** is divided into zones, for example, nine in number, each of which is controlled by a thermostat **36**. When the gun barrel is substantially horizontal, that portion of blanket **31** overlying rigid portion **23** is exposed almost entirely to the exterior of the gun. Therefore, approximately half of thermostats **36** will be used to control the amount of heat imparted to the first half of the heating wire zones as needed to sufficiently anti-ice that portion of blanket **31**. The thermostats **36** project through both the rigid portion **23** and the flexible portion **26** of the gun port shield and contact a face of weather facing **31**. They are maintained in place by a plug connector **37** and screw and washer as clearly shown in FIG. 5. The remainder of thermostats **36** are similarly mounted in support bars **27** in flexible portion **26** of the shield. Those heating element zones controlled by the thermostats disposed in rigid portion **23** are required to protect the exposed face of the gun port shield **11**, by a suitable switching operation, at any time as it becomes necessary. The remaining zones are turned on or off, as signaled by their associated thermostats, by suitable switches as each zone enters into or leaves the gun port opening. Not only is an objectionable collection of ice on the shield prevented by the heating elements in blanket **31**, but the door's sleeve **21** is also kept heated so that there is no danger of door **22** being frozen shut. Where necessary, the gun port shield may be extended to seal a twin or triple gun port opening.

From the foregoing, it is apparent that an all-metal gun port shield has been designed which is inexpensive and effective in protecting the operating equipment within the gun system against weather, rain, water, dust, gas, smoke and the like.

The present gun port shield design is also capable of withstanding any usual shock or gun fire and negative pressure caused by missile launching and will not permit an objectionable amount of ice coating to retard either the functioning of the gun barrel elevation or the opening of the door on the empty case ejector chute.

The present design is simple in construction, manufacture, assembly and disassembly with the components thereof readily replaceable at any time.

What is claimed is:

1. A gun port shield for a gun system housing having a gun port therein of a length allowing maximum elevation from zero and maximum depression from zero of a barrel means protruding therethrough, said shield comprising in combination with the housing and gun barrel means:

a rigidly arcuately-shaped shield portion having a first aperture therein through which said gun barrel means protrudes, said rigid portion when the barrel is in horizontal position, spanning the upper half of the gun port;

a flexible shield portion attached to one end of said rigid portion and when the barrel is in horizontal position, spanning said gun port throughout the remaining port length, said flexible portion being of a length sufficient to span a portion of said gun port when said gun barrel means is elevated to a position of maximum elevation;

a first pair of arcuate tracks, channel-shaped in cross-section, rigidly secured to the inside of said housing along the gun port on both sides of said rigid shield portion throughout the entire length thereof and secured in a manner for guiding said shield about the elevation axis of said gun barrel means when the gun barrel is elevated from zero to its maximum elevation position; and

a second pair of tracks, channel-shaped in cross-section, rigidly secured to the inside of said housing on both sides of said flexible shield portion throughout the entire length thereof and being secured in alignment with said first tracks and in a manner for guiding said flexible portion away from the elevation axis of said gun barrel means as said barrel means is depressed from its maximum elevation position to its maximum depression position.

2. The gun port shield of claim **1** wherein a plurality of rollers are provided on each end of said rigid shield portion, said rollers being slidably received within the channels of said first tracks.

3. The gun port shield of claim **2** wherein said flexible portion comprises:

a plurality of parallel bars interlinked to each other; and

a roller at each end of each said bar, said rollers being slidably received within the channels of said second tracks.

4. The gun port shield of claim **2** wherein said rigid portion is provided with a second aperture therein in alignment with an empty case ejector chute for the passage of shells through said chute and out of said housing, said rigid portion also having a closure means thereon operable to open and close said second aperture.

5. The gun port shield of claim **1** further comprising a weather facing secured to the outer face of said rigid shield portion and said flexible shield portion.

6. The gun port shield of claim **5** wherein said weather facing comprises electric heating elements laminated between synthetic rubber sheets, whereby said gun port shield and said closure means may be heated to prevent the formation of ice.

7. The gun port shield of claim **6** further comprising a plurality of thermostats provided in said rigid shield portion and in said bars of said flexible shield portion, each said thermostat being in contact with an inner face of said facing and being operable to regulate said heating elements in a manner to protect said gun port shield when exposed.

No references cited.

BENJAMIN A. BORCHELT, *Primary Examiner.*

S. C. BENTLEY, *Assistant Examiner.*