Patent Right	Date	March 27, 2023	Court	Intellectual Property High Court, First Division
	Case number	2022 (Gyo-Ke) 10009		
- A case in which a JPO decision was rescinded for an invention titled "gas-system extinguishment facility" by stating that the determination on how easily it would have been to conceive of the difference from the Cited Invention in the decision to revoke a patent has errors.				

Case type: Rescission of Patent Revocation Decision

Result: Granted

References: Article 29, paragraph (2) of the Patent Act

Related rights, etc.: Patent No. 6674704

Decision of JPO: Opposition No. 2020-700740

Summary of the Judgment

1 This case is a suit against the decision to revoke a patent for the Invention titled "gas-system extinguishment facility". The present decision determined that the Invention could have been easily made by a person ordinarily skilled in the art on the basis of the invention described in Exhibit Ko 1 (hereinafter, referred to as "Exhibit Ko 1 Invention"), the technical matters described in Exhibit Ko 2 (hereinafter, referred to as "Exhibit Ko 2 Technical Matters"), and well-known arts.

The Plaintiff asserted errors in the determination on the inventive step of the Invention with Exhibit Ko 1 as the primary cited reference as grounds for rescission.

2 The judgment determined as follows in the gist, stated that the determination on how easily it would have been to conceive of the Difference 1 between the Invention and the Exhibit Ko 1 Invention in the present decision, and rescinded the present decision.

(1) Exhibit Ko 1 describes, as a configuration example of the nitrogen extinguishment facility, a plurality of nitrogen-gas storage containers with "container valves" installed in a storage container chamber and has description that the number of storage containers is the number of pieces acquired by dividing a required extinguisher amount by a filled amount per storage container.

On the other hand, Exhibit Ko 1 does not have description or suggestion on valve-opening timing of the container valve of each of the storage containers or introduction of a nitrogen gas into a protected section by preventing overlap of peak pressures of the nitrogen gas released from one storage container and another storage container.

(2) Exhibit Ko 2 is found to describe the Exhibit Ko 2 Technical Matters ("... in a fire-hazard suppression system 10 including ... a plurality of high-pressure inactive gas storage cylinders 12a to 12c, a rupture disc 16a disposed along a piping 40 between

the gas cylinders 12a and 12b, a rupture disc 16b disposed along the piping 40 between the gas cylinders 12b and 12c, a supply line 24, and an ejection nozzle 26 which release the inactive gas into a ... room 14 ..., by shifting opening time of ... the rupture disc 16a, ... and the rupture disc 16b ..., as the result that a point of time when gas supply from the cylinder 12a is started, a point of time when the gas supply from the cylinder 12b is started, and a point of time when the gas supply from the cylinder 12c is started are shifted, the inactive gas is sequentially released into the protected room 14 at a speed controlled so that excessive pressure is not applied.")

However, the "rupture disc" in the Exhibit Ko 2 Technical Matters is a disposable member which operates (ruptures) by a pressure determined in advance inside a piping or the like, and once it operates (ruptures), it is not closed again, and an operation and a function are different from those of the "container valve" in which the valve is repeatedly opened/closed.

According to Exhibit Ko 2 described matters, Exhibit Ko 2 is found to have a disclosure that [i] in the fire-hazard suppression system described in Exhibit Ko 2, a rupture disc is mounted between a plurality of (first and second) gas cylinders, and when a gas in the first gas cylinder is released into a protected room (sealed room), and a level of the remaining gas in the first gas cylinder lowers, the rupture disc ruptures by a pressure difference between the first and the second gas cylinders, the gas in the second gas cylinder is released into the protected room, and by means of the sequential release of the gas from the plurality of gas cylinders, respectively, as above, overpressure of the protected room can be prevented; [ii] depending on the size of the protected room, the capacity of the gas cylinder, and the other factors, more gas cylinders and rupture discs are used as necessary, and the closed room (protected room) can be properly protected.

On the other hand, although Exhibit Ko 2 has the description that a gas flow from the gas cylinder to the piping is controlled by opening/closing of the valve, it is a description on the premise that the rupture disc is used, and it does not have description or suggestion that pressurization of the protected area or the protected room is prevented by sequentially releasing the gas from each of the plurality of gas cylinders by shifting the valve-opening timing of each of the valves without using the rupture discs.

(3) As described above, from the viewpoints that the "container valve" of the nitrogen-gas storage container with the "container valve" described in Exhibit Ko 1 and the "rupture disc" in the Exhibit Ko 2 Technical Matters have different operations and functions, and neither Exhibit Ko 1 nor Exhibit Ko 2 has description or

suggestion on prevention of the pressurization of the protected area or the protected room by sequentially releasing the gas from each of the plurality of gas cylinders by shifting the valve opening/closing timing of the container valve of the storage container or the valve of the gas cylinder, even if a person ordinarily skilled in the art who contacted Exhibits Ko 1 and Ko 2 could have conceived of application of the rupture disc described in Exhibit Ko 2 in order to prevent the pressurization of the protected area or the protected room in the Exhibit Ko 1 Invention, it cannot be approved that the person ordinarily skilled in the art could have easily conceived of realization of the prevention of the pressurization by sequentially releasing the gas from each of the plurality of gas cylinders by shifting the valve-opening timing of the "container valve" attached to each of the "nitrogen-gas storage containers" without using the rupture disc.

(4) Assuming that, from the description in Exhibits Ko 7 and Ko 8, "in an extinguishment facility including a plurality of extinguisher gas containers and introducing the extinguisher gas via introducing means such as a piping into a protected section, the extinguisher gas is introduced into the protected section by shifting valve-opening timings of a container valve of one container in the plurality of the extinguisher gas containers and the container valve of another container, and the valve-opening timing of the container valve is determined by a control portion" can be found to be well-known before the present application in the technical field of the gas-system extinguishment facilities as stated in the present decision, there is no evidence or logical grounds sufficient to find that a person ordinarily skilled in the art is motivated to apply the aforementioned well-known art to the Exhibit Ko 1 Invention.

Judgment Rendered on March 27, 2023
2022 (Gyo-Ke) 10009, Case of Seeking Rescission of Patent Revocation Decision
Date of Conclusion of Oral Argument: November 22, 2022

Judgement

Plaintiff: AIR WATER SAFETY SERVICE INC.

Defendant: Commissioner of the Japan Patent Office

Main Text

1 In relation to the decision rendered by the Japan Patent Office (JPO) on Opposition No. 2020-700740 on December 21, 2021, the part that "the patent for the claim 1 of Patent No. 6674704 shall be revoked" shall be rescinded.
2 The defendant shall bear the court costs.

Facts and Reasons

No. 1 Claim

The same gist as the main text, paragraph 1

No. 2 Outline of the Case

1 Outline of Procedures at the JPO and the like

(1) The Plaintiff filed a patent application (Patent Application No. 2015-90208. Hereinafter, referred to as the "Present Application") for an invention with the title of invention "GAS-SYSTEM EXTINGUISHMENT FACILITY" on April 27, 2015 and was granted registration of establishment of the patent right (Patent No. 6674704, number of claims: 2, hereinafter, this patent shall be referred to as the "Present Patent") on March 11, 2020 (Exhibit Ko 1).

(2) Against the Present Patent, A filed an opposition to the grant of a patent (Opposition No. 2020-700740 case) on September 29, 2020 (Exhibit Ko 12).

The Plaintiff received a notice of reasons for revocation as of January 7, 2021 (Exhibit Ko 13), filed a request for correction that Claim 1 in the scope of claims of the present patent should be corrected and Claim 2 should be deleted (Exhibit Ko 15) as of March 11 of the same year, and then received a notice of reasons for revocation

(preliminary announcement of decision) (Exhibit Ko 17) as of June 30 of the same year and in response, filed a request for correction that Claim 1 in the scope of claims of the Present Patent should be corrected and Claim 2 should be deleted (hereinafter, referred to as the "Present Correction"　Exhibit Ko 19) as of September 2 of the same year.

After that, the Japan Patent Office approved the present correction on December 21 of the same year and rendered a decision that "The Patent for Claim 1 of Patent No. 6674704 shall be revoked.　The opposition to the granted Patent for Claim 2 of Patent No. 6574704 shall be dismissed." (Hereinafter, referred to as the "Present Decision".), and a certified copy thereof was delivered on January 6, 2022.

(3) The Plaintiff filed the present lawsuit seeking rescission of the part that "the Patent for Claim 1 of Patent No. 6674704 shall be revoked" in the Present Decision on February 1, 2022.

2 Description of Scope of Claims

The description of Claim 1 in the scope of claims after the Present Correction is as follows (hereinafter, the invention according to Claim 1 shall be referred to as the "Present Invention", underlined parts are parts corrected by the Present Correction).

[Claim 1]

A gas-system extinguishment facility in which constructing costs are reduced by thinning a duct and a piping in a building and a degree of freedom in design is improved, comprising:

a plurality of containers in which an extinguisher gas is stored;

introducing means constituted by the piping for introducing the extinguisher gas in the plurality of containers into a protected section, which is a room provided in the building, where electronic devices are provided and water cannot be used for extinguishment;

a duct, extending in a vertical and/or a lateral direction in the building, which is connected to a side surface so as to penetrate the side surface of the protected section into which the extinguisher gas is introduced and to eject the extinguisher gas from the protected section; and

a damper provided an end part of the duct at a pressure relief port of the protected section, wherein

the duct and the protected section are caused to communicate with or to be shut off by opening/closing of the damper;

the extinguisher gas is introduced into the protected section by shifting valve-

opening timing of container valves of one container and another container among the plurality of containers so that overlap of peak pressures of the extinguisher gas released from the one container and the other container is prevented; and

there is further provided a control portion which determines first valve-opening timing of the container valve of the one container and second valve-opening timing of the container valve of the other container, which is different from the first valve-opening timing, prevents the overlap of the peak pressures of the extinguisher gas, and is connected to each of the container valves.

3 Gist of Reasons of the Present Decision

(1) The reasons of the Present Decision are as described in the written decision of opposition in the Appendix (copy).

The gist of the reasons is that the Present Invention could have been easily made by a person ordinary skilled in the art on the basis of an invention (hereinafter, referred to as "Exhibit Ko 1 Invention") described in Exhibit Ko 1, which is a publication distributed before the present application ("Inactive gas extinguishment facility design/construction standards [second edition]" by Japan Fire Extinguishing Systems Manufacturers Association, General Incorporated Association, May 2013), technical matters (hereinafter, referred to as "Exhibit Ko 2 Technical Matters") described in Exhibit Ko 2-1 (International Publication No. 2007-032764, translation: Exhibit Ko 2-2, hereinafter, Exhibit Ko 2-1 and Exhibit Ko 2-2 are referred together as "Exhibit Ko 2") and well-known art and thus, the patent for the Present Invention was made in violation of Article 29, paragraph (2) of the Patent Act and should be revoked under Article 113, item (ii) of the same Act.

(2) The Exhibit Ko 1 invention found in the present decision, common features and differences between the Present Invention and the Exhibit Ko 1 invention, the Exhibit Ko 2 Technical Matters, and determination on how easily it was conceived of for the difference made by the Present Decision are as follows.

A. Exhibit Ko 1 Invention

A nitrogen extinguishment facility, which is an automatic-start type inactive-gas extinguishment facility releasing nitrogen, comprising:

a plurality of nitrogen-gas storage containers with container valves;

a piping which releases a nitrogen gas in the nitrogen-gas storage container by an injection head in a protected section in a building in which a telephone machine, a communication machine, a computer, and the like are provided;

a pressure relief duct serving also as an exhaust air duct for ejecting the nitrogen gas from the protected section, connected to a wall surface so as to penetrate the wall

surface of the protected section into which the nitrogen gas is released and provided so as to be introduced to an outside of the building having the protected section; and

a pressure relief damper, which is a pressure relief port of the protected section, provided on an end part of the pressure relief duct, wherein

the pressure relief duct and the protected section are caused to communicate with and to be shut off by opening/closing of the pressure relief damper.

B. Common features and differences between Present Invention and Exhibit Ko 1 Invention

(Common features)

A point that "A gas-system extinguishment facility, comprising:

a plurality of containers in which an extinguisher gas is stored;

introducing means constituted by a piping for introducing the extinguisher gas in the plurality of containers into a protected section, which is a room provided in a building, where electronic devices are provided and water cannot be used for extinguishment;

a duct, extending in a vertical and/or a lateral direction in the building, which is connected to a side surface so as to penetrate the side surface of the protected section into which the extinguisher gas is introduced and to eject the extinguisher gas from the protected section; and

a damper provided at a pressure relief port of the protected section and an end part of the duct, wherein

the duct and the protected section are caused to communicate with and to be shut off by opening/closing of the damper.

(Difference 1)

A point that, in the Present Invention, "the extinguisher gas is introduced into the protected section by shifting valve-opening timing of container valves of one container and another container among the plurality of containers so that overlap of peak pressures of the extinguisher gas released from the one container and the other container is prevented; and there is further provided a control portion which determines first valve-opening timing of the container valve of the one container and second valve-opening timing of the container valve of the other container, which is different from the first valve-opening timing, prevents the overlap of the peak pressures of the extinguisher gas, and is connected to each of the container valves", while, although the Exhibit Ko 1 Invention is an automatic-start type, specification is not made such that the nitrogen gas is introduced into the protected section by preventing the overlap of the valve-opening timing of the container valves of "the

plurality of nitrogen-gas storage containers with container valves" and of the peak pressures of the nitrogen gas released from the one storage container and the other storage container, and matters related to the control portion are not specified, either.

(Difference 2)

A point that the Present Invention is "a gas-system extinguishment facility in which constructing costs are reduced by thinning a duct and a piping in a building, and a degree of freedom in design is improved", while, although the Exhibit Ko 1 Invention includes a "pressure relief duct" and a "piping", constructing costs and the degree of freedom in design are not specified.

C. Exhibit Ko 2 Technical Matters

In a fire-hazard suppression system 10 including:

a plurality of high-pressure inactive-gas storage cylinders 12a to 12c containing an inactive gas;

a rupture disc 16a disposed along a piping 40 between gas cylinders 12a and 12b, and a rupture disc 16b disposed along the piping 40 between gas cylinders 12b and 12c;

a supply line 24 which releases the inactive gas into a protected room 14 such as a data center, a computer room, and the like containing valuable devices or components and an ejection nozzle 26; and

a ventilation hole provided in the protected room 14 in order to prevent an excessive pressure,

by shifting opening time of a main valve 22 disposed between the piping 40 and the supply line 24, the rupture disc 16a disposed along the piping 40 between the gas cylinders 12a and 12b, and the rupture disc 16b disposed along the piping 40 between the gas cylinders 12b and 12c, as the result that a point of time when gas supply from the cylinder 12a is started, a point of time when the gas supply from the cylinder 12b is started, and a point of time when the gas supply from the cylinder 12c is started are shifted, the inactive gas is sequentially released into the protected room 14 at a speed controlled so that excessive pressure is not applied.

D. Determination on how easily it could have been conceived of for Difference 1

A person ordinarily skilled in the art who contacts Exhibit Ko 2 Technical Matters could have easily recognized that, in the "automatic-start type" Exhibit Ko 1 Invention including the "plurality of nitrogen-gas storage containers with container valves", the "nitrogen gas" can be released into the protected section in a state in which the excessive pressure is applied, and in order to prevent this, it is only necessary to configure such that the nitrogen gas is sequentially released into the

protected section at a speed controlled so that the excessive pressure is not applied.

Moreover, by means of Exhibit Ko 2 Technical Matters, that "the nitrogen gas is sequentially released into the protected room 14 at a speed controlled so that the excessive pressure is not applied" is realized by shifting the opening time of the "main valve 22", the "rupture disc 16a", and the "rupture disc 16b", but for the "automatic-start type" Exhibit Ko 1 Invention including the "plurality of nitrogen-gas storage containers with container valves", a person ordinarily skilled in the art could have easily predicted that sequential release of the nitrogen gas into the protected section at the speed controlled so that the excessive pressure is not applied can be realized by shifting the valve-opening timing of the "container valve" attached to each of the "nitrogen-gas storage containers", and there is no need to use the rupture disc or the like.

Moreover, the Exhibit Ko 1 Invention is an automatic-start type and naturally includes the control portion connected to the container valve, but by considering the description in the paragraph [0025] in the description attached to an application form of the present application (hereinafter, referred to as the "Present Description" including drawings, Exhibit Ko 11), it cannot help but be interpreted that the term "determines" in "determines first valve-opening timing of the container valve of the one container and second valve-opening timing of the container valve of the other container, which is different from the first valve-opening timing and prevents the overlap of the peak pressures of the extinguisher gas" only means that the valve-opening timing is determined by a signal from the control portion, and to set the timing such that "first valve-opening timing of the container valve of the one container and second valve-opening timing of the container valve of the other container, which is different from the first valve-opening timing and prevents the overlap of the peak pressures of the extinguisher gas" is only inevitable timing required for realizing the sequential release into the protected section at the speed controlled so that the excessive pressure of the nitrogen gas is not applied by shifting the valve-opening timing of the "container valve" attached to each of the "nitrogen-gas storage containers" and thus, that "there is further provided a control portion which determines first valve-opening timing of the container valve of the one container and second valve-opening timing of the container valve of the other container, which is different from the first valve-opening timing and prevents the overlap of the peak pressures of the extinguisher gas, and is connected to each of the container valves" could also have been easily conceived of by a person ordinarily skilled in the art.

Moreover, in view of the described matters in Exhibit Ko 7 (Unexamined Patent Application Publication No. 2007-330438) and Exhibit Ko 8 (Unexamined Patent Application Publication No, 1995-39603), that "in an extinguishment facility including a plurality of extinguisher gas containers and introducing extinguisher gas via introducing means such as a piping into a protected section, the extinguisher gas is introduced into the protected section by shifting valve-opening timings of a container valve of one container among the plurality of the extinguisher gas containers and the container valve of the other container, and the valve-opening timing of the container valve is determined by a control portion" can be found to be a well-known art before the present application in the technical field of the gas-system extinguishment facilities.

Then, a person ordinarily skilled in the art who contacted the Exhibit Ko 2 Technical Matters should have easily conceived of the invention specifying matters of the Present Invention for Difference 1 by shifting the valve-opening timing of the "container valve" attached to each of the "nitrogen-gas storage containers" in the Exhibit Ko 1 Invention.

E Determination on how easily it could have been conceived of for Difference 2

As described in the described matters of Exhibit Ko 6 (Unexamined Patent Application Publication No. 2014-108185), that "constructing costs are reduced and the degree of freedom in design can be improved by thinning a piping, if a gas flowrate per time flowing through the piping is small" was considered to be a well-known matter before the present application.

Since it is obvious that the gas flowrate per time flowing through the supply line 24 is reduced by "shifting opening time of a main valve 22 disposed between the piping 40 and the supply line 24, the rupture disc 16a disposed along the piping 40 between the gas cylinders 12a and 12b, and the rupture disc 16b disposed along the piping 40 between the gas cylinders 12b and 12c, as the result that a point of time when gas supply from the cylinder 12a is started, a point of time when the gas supply from the cylinder 12b is started, and a point of time when the gas supply from the cylinder 12c is started are shifted, the inactive gas is sequentially released into the protected room 14 at a speed controlled so that the excessive pressure is not applied", the invention specifying matters of the Present Invention for Difference 2 only specifies matters which inevitably occur concomitantly with the invention specifying matters of the Present Invention for Difference 1 in the Exhibit Ko 1 Invention, and there cannot be a particular difficulty in that point.

4 Grounds for Rescission

Errors in determination on inventive steps of the Present Invention with Exhibit Ko 1 as the primary cited reference

(omitted)

No. 4 Judgment of this court

1 Described matters of this description

(1) The Present Description (Exhibit Ko 11) has the following description (for FIGS. 1 to 6 cited in the following description, see Appendix 1).

A [Technical Field]

[0001]

This invention relates to a gas-system extinguishment facility.

[Background Art]

[0002]

Conventionally, the gas-system extinguishment facility is disclosed in Unexamined Patent Application Publication No. 2014-108185 (Patent Document 1), for example.

[Technical Problem]

[0004]

The conventional gas-system extinguishment facility has had problems that constructing costs are high and a degree of freedom in design is low. Thus, this invention was made in order to solve the aforementioned problems and has an object to provide a gas-system extinguishment facility which can reduce the constructing costs and has a high degree of freedom in design.

[Solution to Problem]

[0005]

A gas-system extinguishment facility according to an aspect of this invention includes a plurality of containers in which an extinguisher gas is stored, introducing means for introducing the extinguisher gas in the plurality of containers into a protected section, and a duct for ejecting the extinguisher gas from the protected section into which the extinguisher gas is introduced, and the extinguisher gas is introduced into the protected section by shifting valve-opening timings of one container among the plurality of containers and another container.

B. [Description of Embodiments]

[0008]

Hereinafter, embodiments of this invention will be explained by referring to the

drawings. In the embodiments described below, the same reference numerals are given to the same or corresponding parts, and the explanation therefor will not be repeated. Moreover, the respective embodiments may be combined.

[0009]

(Embodiment 1)

The inventor analyzed the conventional problems; that is, the problems that the constructing costs are high and the degree of freedom in design is low in the gas-system extinguishment facility. As a result, regarding the costs and the degree of freedom in design of the gas-system extinguishment facility, the inventor found the problems that costs for a piping for introducing the extinguisher gas and a duct for ejecting the extinguisher gas are high, which narrows the degree of freedom in design.

[0010]

The conventional duct extends from a protected area into which the extinguisher gas is introduced to outside a building having the protected area. If the duct becomes thinner than conventional, the constructing costs related to the duct can be lowered. By thinning the piping as well, the constructing costs can be lowered.

[0011]

Moreover, since the duct extends in a vertical and/or lateral direction in the building, it also affects a structure of the building. If the duct is thinned more than conventional, the duct can be laid at a narrow spot where the duct could not have been laid, and the degree of freedom in design is improved. If the piping becomes thinner, the degree of freedom in design is improved.

[0012]

As shown in FIGS. 1 to 3, the gas extinguishment facility includes a piping 3 for sending the extinguisher gas into a protected section 1 and a duct 2 connected to the protected section 1 and ejecting the extinguisher gas.

[0013]

The protected section 1 is a room provided in a construction such as a building. In a room in which electronic devices are provided, water cannot be used for extinguishment, and the extinguisher gas is used for extinguishment. By releasing an extinguisher gas agent from an injection nozzle 4 into the protected section 1 and by filling the inactive extinguisher gas in the protected section 1 so as to reduce oxygen concentration, extinguishment can be performed. As the extinguisher gas, inactive gases such as nitrogen, argon, and the like and halogen gases are used.

[0014]

The duct 2 is a gas path for releasing the extinguisher gas in the protected

section 1 from the protected section 1. The duct 2 is hollow and may have either of a square shape or a circular shape. At an end part of the duct 2 at a pressure relief port 1a of the protected section 1, a damper 12 is provided, and by opening/closing the damper 12, the duct 2 and the protected section 1 are caused to communicate with each other and to be shut off. The damper 12 is rotatable from a position indicated by a solid line to a position indicated by a dotted line. In this embodiment, only one piece of the duct 2 is provided in the protected section 1, but a plurality of the ducts 2 may be provided.

[0015]

The duct 2 extends from an inlet (pressure relief port 1a) to an outlet 13.

The piping 3 is a path for sending the extinguisher gas from the gas storage container 5 disposed outside the protected section 1 into the protected section 1. In the gas storage container 5, a pressure reducing valve (pressure controller) 50 is provided, and the extinguisher gas having passed through the pressure reducing valve 50 is released into the protected section 1 via the piping 3 and the injection nozzle 4.

[0016]

A collecting pipe 17 is connected to the plurality of gas storage containers 5. To the collecting pipe 17, the extinguisher gas is supplied from each of the gas storage containers 5. To any one of the collecting pipe 17, the pressure reducing valve 50, and the gas storage container 5, a control portion 15 which controls the supply of the extinguisher gas from the gas storage container 5 to the collecting pipe 17 is connected.

C. [0017]

As shown in FIG. 3, a curve 101 indicates a pressure of the extinguisher gas agent in one of the gas storage containers 5. A curve 102 indicates a pressure of the extinguisher gas agent at the outlet of a container valve 17 when valves of the five gas storage containers 5 are opened at the same time. A curve 103 indicates a pressure of the extinguisher gas agent at the injection nozzle 4 when the valves of the five gas storage containers 5 are opened at the same time. A point 105 indicates a maximum pressure in the curve 102.

[0018]

Curves 111 to 115 indicate pressures of the extinguisher gas agent at the outlet of the pressure reducing valve 50 as a container valve when the valves of the first to fifth gas storage containers 5 are opened. A curve 104 indicates a pressure of the extinguisher gas at the outlet of the pressure reducing valve 50 constituted by a total of the pressures of the extinguishers indicated by the curves 111 to 115.

[0019]

The point 105 indicates the maximum pressure in the curve 102, and a size of the pressure relief port 1a is determined by considering this maximum pressure. That is, when the maximum pressure indicated by the point 105 is large, a diameter of the pressure relief port and a diameter of the duct 2 need to be made larger, which increases a construction cost. If the valves of the five gas storage containers 5 are opened at the same time, peak pressures of the extinguisher gases released from each of the gas storage containers 5 overlap each other. As a result, the maximum pressure becomes larger, and the diameters of the pressure relief port 1a and the duct 2 become larger. On the other hand, by shifting valve-opening timings of the five gas storage containers 5, the overlap of the peak pressures of the extinguisher gases released from each of the gas storage containers 5 indicated by the curves 111 to 115 can be prevented. As a result, the maximum pressure in the curve 104 becomes smaller than the maximum pressure in the curve 105. Therefore, the sizes of the pressure relief port 1a and the duct 2 can be reduced. Moreover, the piping 3 can also be thinned.

[0020]

FIG. 3 illustrates the pressure reducing valve 50 whose flowrate control (pressure control) is not stable. Since the flowrate control is not stable, the outlet pressure of the pressure reducing valve 50 indicated by the curve 102 is not stable, either.

D. [0021]

FIGS. 4 to 6 illustrate an example in which the pressure reducing valve 50 whose flowrate control (pressure control) is stable is used. A curve 121 in FIG. 4 illustrates a pressure of the extinguisher gas agent at the outlet of the collecting pipe 17 when the valves of the five gas storage containers 5 are opened by shifting the timing. A curve 122 indicates a pressure of the extinguisher gas agent at the injection nozzle 4 when the valves of the five gas storage containers 5 are opened by shifting the timing.

[0022]

A curve 131 in FIG. 5 illustrates a pressure of the extinguisher gas agent at the outlet of the collecting pipe 17 when the valves of the five gas storage containers 5 are opened by shifting the timing. A curve 132 illustrates a pressure of the extinguisher gas agent at the injection nozzle 4 when the valves of the five gas storage containers 5 are opened by shifting the timing.

[0023]

A curve 141 in FIG. 6 illustrates a pressure of the extinguisher gas agent at the outlet of the pressure reducing valve 50 when the valves of the five gas storage containers 5 are opened by shifting the timing.

[0024]

As shown in FIGS. 4 to 6, in the pressure reducing valve 50 with the stable flowrate control (pressure control), an outlet pressure is stable. Since the valves of the five gas storage containers 5 are opened by shifting the timing, the outlet pressure of the collecting pipe 50 is substantially constant.

[0025]

Note that, in FIGS. 4 to 6, the valve of the storage container 5 is opened every five seconds, but this valve-opening timing is not necessarily limited to five seconds. Moreover, the valves of the gas storage containers 5 are opened at equal time intervals, but the valves of the gas storage containers 5 may be opened at unequal time intervals. The valve-opening timing can be determined by the control portion 15.

[0026]

That is, the gas-system extinguishing facility includes a plurality of gas storage containers 5 in which the extinguisher gas is stored, the piping 3 as the introducing means for introducing the extinguisher gas in the plurality of gas storage containers 5 into the protected section 1, and the duct 2 for ejecting the extinguisher gas from the protected section 1 into which the extinguisher gas is introduced, and the extinguisher gas is introduced into the protected section 1 by shifting the valve-opening timings of one container in the plurality of gas storage containers 5 and another container.

E. [0033]

The embodiments disclosed at this time should be considered to be exemplification in all the points and non-restrictive. The scope of the present invention is not indicated by the aforementioned explanation but by the scope of claims and is intended to include meaning equal to and all the changes within the range of the scope of claims.

[Industrial Applicability]

[0034]

This invention can be utilized in the field of gas-system extinguishment facilities.

(2) According to the described matters in (1) described above, it is found that the present description has the following disclosure relating to the present invention.

A. The conventional gas-system extinguishment facility has had problems that constructing costs are high and a degree of freedom in design is low and thus, "this

invention" has an object to provide a gas-system extinguishment facility which can reduce the constructing costs and has a high degree of freedom in design, which is a problem ([0004]).

B. The gas-system extinguishment facility of "this invention" includes, as means for solving the aforementioned problems, a plurality of gas storage containers in which the extinguisher gas is stored, a piping as introducing means for introducing the extinguisher gas in the plurality of gas storage containers into the protected section, and a duct for ejecting the extinguisher gas from the protected section into which the extinguisher gas is introduced, employs such a configuration that the valve-opening timings of one container in the plurality of gas storage containers and another container are shifted, and the extinguisher gas is introduced into the protected section, whereby the overlap of the peak pressures of the extinguisher gas in the plurality of gas storage containers can be prevented and as a result, such an effect is exerted that the maximum pressure constituted by the total of the pressures of the extinguisher gas at the outlets of the container valves when the valve of each of the gas storage containers is opened can be made smaller, the pressure relief port and the duct are reduced in size, and the piping can be made thinner ([0005], [0017] to [0019]).

2. Errors in determination on inventive step with Exhibit Ko 1 as the primary cited reference

(1) Described matters in Exhibit Ko 1

A. Exhibit Ko 1 ("Inactive gas extinguishment facility design/construction standards [second edition]" by Japan Fire Extinguishing Systems Manufactures Association, General Incorporated Association, May 2013) has the following description (for FIG. 9.6.1.2 and FIG. 9.6.2.8 cited in the following description, see Appendix 2).

(A) "7) Communication equipment room with floor area of 500 m^2 or more"

(column "Fire prevention property or part thereof", "Article 13, Order" in Table 9.3.1.1 "Reference area and the like of installation target for inactive gas extinguishment facility" (page 45) in "Chapter 3 Installation target for inactive gas extinguishment facility")

(B) "Telephone machine room, communication equipment room, computer room, machine control room"

("Specific example" in which an "environmental state" corresponds to "a place with a risk of a fumigatory fire" in the "installation location" column in Table 9.5.2.10 "Environmental state and applicable sensor (No. 2)" (page 99) in "2.6.2 Selection of fire sensing device" in "Chapter 5 Inactive-gas extinguishment facility releasing carbon dioxide")

(C) "Chapter 6 Inactive-gas extinguishment facility which releases nitrogen
Section 1 Types and configurations of inactive-gas extinguishment facilities which release nitrogen
1.1 Extinguisher

A nitrogen gas is used for the extinguisher of the inactive-gas extinguishment facility which releases nitrogen (hereinafter, referred to as a nitrogen extinguishment facility). For the nitrogen gas, those conforming to Grade 2, JIS K 1107 shall be used." (Lines 1 to 5, page 192)

(D) "In the nitrogen extinguishment facility, an automatic start method shall interlock with a fire alarm in principle, and basically, it is switched to a manual type in a case of a manned situation such as maintenance.
(Lines 34 to 35, page 192)

(E) "FIG. 9.6.1.2 Configuration example of facility (No. 2)" (page 194) describes a "pressure relief damper" on a right wall surface in the protected section 1, and on the lower right in the figure, a plurality of "nitrogen-gas storage containers" with "container valves" are described.

(F) "A part protected by the 'whole-area release method' needs to be divided by a wall, a column, a floor, or a ceiling (if there is no ceiling, a beam or a roof) made of a non-combustible material, similarly to a carbon-dioxide extinguishment facility. Moreover, at an opening portion provided in the aforementioned part (hereinafter, referred to as a protected section), an automatic closing device should be provided. In the nitrogen extinguishment facility, all the opening portions excluding the 'pressure relief port', which will be described later, shall be automatically closed before emission of the extinguisher. Note that, for those without a risk of reducing a fire extinguishing effect such as an opening portion of a water drain, it may be so configured that the automatic closing device does not have to be provided."
(Lines 12 to 17, page 196)

(G) "2.1.3 Incidental facility

When the nitrogen extinguishment facility is to be installed, various incidental facilities are required other than the extinguishment facility.
Examples of the required incidental facilities are shown here. Since there are matters which will be required other than the matters described here, it is important to consider them for each protected section and to consult also with fire-fighting organizations in jurisdiction.
...

(9) Installation of exhaust fans and ducts as an extinguisher ejecting measure

after extinguishment (normal exhaust fan/exhaust duct can be used for that purpose, too, if there is no flow-out to the other sections by considering a flow direction and the like.)

(10) Ensuring illuminance of manual start device (control box) part

(11) Installation of pressure relief port (pressure relief port) as well as duct and damper of the same"

(Lines 1 to 16, page 198)

(H) "2.2. Calculation of extinguisher amount

The nitrogen extinguishment facility performs fire extinguishment by releasing nitrogen as the extinguisher so as to lower oxygen concentration in the air. Although there is some difference depending on combustibles in the protected section, the fire extinguishment can be achieved by lowering the oxygen concentration to approximately 12.5%. The required extinguisher amount shall be calculated as follows."

(Lines 17 to 20, page 198)

"2.2.3 Calculation of required extinguisher amount

The required extinguisher amount W (m^3) is acquired by multiplying a volume Vt (m^3) of the protected section by a calculation coefficient Fv (m^3/m^3).

W = Vt x Fv"

(Lines 35 to 40, page 198)

"2.2.4 Number of storage containers

The installed extinguisher amount is a value acquired by multiplying the number of containers (digits after a decimal point rounded-up) acquired by dividing the aforementioned W(m^3) by a filled amount per storage container by a filled amount. The number of containers is acquired as follows.

N = W/filled amount

N: number of containers (pieces)"

(Lines 3 to 7, page 199)

(I) "2.5.1 Selection of piping method

(1) Drop

The storage container installed in a storage container chamber and an injection head installed in the protected section are connected by a piping, and a drop of the piping at this time (referring to a perpendicular distance from a part at the lowest position of the piping for the section to a part at the highest position) is speculated to be 50 m or less."

(Lines 5 to 9, page 203)

(J) "2.5.6 Pressure relief measures

In order to alleviate an internal pressure in a section which rises by emission of the extinguisher into the protected section, a pressure relief port should be properly installed. This pressure relief port shall be closed at the time when the emission of the extinguisher is finished, in order to maintain the extinguisher concentration in the section for a longer time. For that purpose, a pressure relief damper is provided immediately close to the wall surface of the protected section. It is a structural example as shown in FIG. 9.6.2.7, and the damper is 'opened' by a pressure of the released extinguisher, and when the pressure recovers (returns to an atmospheric pressure), the damper is 'closed' by an adjustment weight. Other than that, an electric damper may also be used, but attention should be paid to control of opening/closing and a power supply which should be an emergency power supply."
(Lines 8 to 15, page 207)

(K) "(2) Points of attention for pressure relief port

A gas ejected by pressure relief is not only air in the protected section but also includes combustion product gas generated by the fire. The combustion product gas contains toxic gases such as carbon monoxide in many cases and thus, sufficient attention should be paid to a path of the pressure relief duct or a release destination to an outside so that people in the other rooms or at a release destination are not exposed. Therefore, the pressure relief port should be installed in a wall facing the outside or should be led by a duct to a safe spot outside. The safe spot outside here refers to a place where people do not approach easily and a high part such as a roof floor or a space without a house window in the vicinity, which is a place where ventilation of outside air is favorable and ejected smoke or the like can be sufficiently diffused, and the following conditions should be satisfied in principle.

...

Moreover, a duct for the pressure relief measure is preferably for exclusive use. However, if the duct is also used as an exhaust duct for ejecting the extinguisher after release of the extinguisher or a duct for general air-conditioning, control should be executed by a chucking damper, a motor damper, or the like so that the gas ejected by the pressure relief does not flow into the other rooms and the like."
(Line 30, page 207 to line 9, page 208)

(L) "FIG. 9.6.2.8 Examples of pressure relief measures (duct path)" (page 208) describes a pressure relief duct provided by being extended to outside of a building having a gas protected section and penetrating a right wall surface of the gas protected section and a pressure relief damper provided at an end part of the pressure relief duct

at a pressure relief port of the gas protected section."

(M) "2.6.2 Selection of fire sensing device

In compliance with Chapter 5, Section 2, 2.6.2."

(Lines 8 to 9, page 210)

(N) "2.12 Extinguisher ejection measures

In the protected section in which the nitrogen extinguishment facility is installed, a measure for ejecting the extinguisher to a safe place should be taken."

(Lines 3 to 4, page 212)

B. According to the described matters in the aforementioned A, it is found that Exhibit Ko 1 describes Exhibit Ko 1 Invention (Second, 3(2)A described above).

(2) Described matters of Exhibit Ko 2

Exhibit Ko 2 (International Publication No. WO2007-032764. Original: Exhibit Ko 2-1, Translation: Exhibit Ko 2-2) has the following description (for FIGS. 1, 2, and 4 cited in the description below, see Appendix 3).

A. "Fire-hazard suppression system with sequential release of inactive gas by rupture disc and pressure drop

Background of Invention

A fire-hazard suppression system has long been used for protecting an area containing valuable equipment or components such as art galleries, data centers, and computer rooms. Conventionally, these systems use halon, which is ideal for hazard suppression since it can suppress a hazard extremely quickly and it can be stored at a relatively low pressure, and only a relatively small amount is required.

However, in recent years, an adverse effect of halon on the ozone layer has become clear, and many governmental agencies banned further use of halon. In some countries, the existing halon systems are being replaced by systems using more environmentally friendly inactive gases such as nitrogen, argon, carbon dioxide and mixtures thereof. Unlike the halon-based extinguishment systems, the inactive-gas based extinguishment systems use natural gases and do not cause ozone layer depletion in the atmosphere.

Combustion occurs when fuel, oxygen, and heat are present in sufficient amounts to support ignition of flammable substances. The fire-hazard suppression system using the inactive gas is based on lowering of an oxygen level inside an enclosed place to such a level that combustion cannot be sustained. In order to eliminate the fire hazard, the inactive gas stored in a large number of high-pressure gas cylinders is released into the enclosed place so as to reduce the oxygen concentration by replacing the oxygen with the inactive gas until the combustion is

extinguished. Normally, the ambient air contains oxygen at a concentration of 21% by volume. In order to effectively eliminate the fire hazard, this concentration should be lowered to less than 12.54%. In order to achieve this goal, a relatively large amount of gas needs to be released.

Particularly, regarding the reduction of oxygen in the atmospheric air when the system was released, personnel in the facilities are affected in health and safety. Careful calculation is needed to ensure that the concentration of the released inactive gas is sufficient to control the combustion but not so high as to incur serious risks to the personnel.

When halon is replaced with the inactive gas in order to prevent the fire hazard, two problems arise in system design. First, supply of a large amount of gas into a protected room in a short period of time (in some countries, fire codes require the gas to be supplied in less than one minute) can generate an excessive pressure in the room and damage the equipment in the room. In the current industrial practice, special and expensive ventilation holes are used in the room in order to prevent the excessive pressure. Secondly, unlike halon, the inactive gas is stored not in a liquid but in a gas form at a normal room temperature. In order to reduce the volume of the storage container, an extremely high pressure is preferable, which is typically between 100 to 300 bar. As a result, the gas distribution system should be capable of withstanding the extremely high pressure. These two limitations are important elements in costs for both new installation and remodeling.

The overpressure in the protected room is mainly caused by uneven release of the inactive gas from the pressure container or a high-pressure peak exceeding a safe threshold value level at the inactive gas release. Since the pressure in the gas container is attenuated exponentially during the gas release, the overpressure typically occurs in the initial few seconds of the release. If the gas release can be throttled to a fairly uniform pressure profile during the release or can be maintained at a level less than the threshold value at all time during the gas release, the overpressure in the protected room can be prevented while the supply of the inactive gas in a predetermined amount in a required time is ensured.

The current systems used for throttling the gas flow require either one of a valve including a controllable variable opening area or an on/off valve."
(Original: line 1, page 1 to line 26, page 2, translation: pages 2 to 3)
B "Brief Summary of the Invention

A controlled pressure release system prevents overpressure in a protected region at gas supply. The system includes a first gas container having a first gas

outlet, a second gas container having a second gas outlet, a piping having a release port, a first pressure responsive valve (such as a rupture disc), and a valve. The piping connects the first and the second gas containers to each other. The first pressure responsive valve is disposed between the first and the second gas outlets. The valve operates the system and can switch between a closed position and an open position. When the valve is switched to the open position, the first gas container communicates with the release port. After that, the first pressure responsive valve is opened by a function of a gas pressure difference caused by lowering of the gas pressure in the first gas container."

(Original: line 28, page 2 to line 7, page 8, translation: page 3)

C "Detailed Description

FIG. 1 is a schematic diagram of a fire-hazard suppression system 10 with sequential release. A plurality of high-pressure inactive-gas storage cylinders 12a to 12c are disposed in a storage region or a room in the vicinity of a closed room 14 to be protected. The inactive-gas storage cylinders 12a to 12c contain an inactive gas released into the protected room 14 when a fire occurs. Between the gas cylinders 12a and 12b, a differential-pressure responsive valve (rupture disc 16a) is disposed. A similar valve (rupture disc 16b) is disposed between the gas cylinders 12b and 12c. When a fire is detected in the protected room 14 by a detector 18 disposed in the protected room 14, a control signal from a control panel 20 opens a main valve 22. Subsequently, in order to lower the oxygen concentration and to extinguish the fire in the protected room 14, the gas is released into the protected room 14 through a supply line 24 and a release nozzle 26. As the result of shifting of opening time of the main valve 22, the rupture disc 16a, and the rupture disc 16b, the release of the gas from the cylinders 12a to 12c is performed sequentially.

FIG. 2 is a front view of a first embodiment of the suppression system 10 with sequential release. The suppression system 10 generally includes the first gas cylinder 12a, the second gas cylinder 12b, the third gas cylinder 12c, the first rupture disc 16a, the second rupture disc 16b, the main valve 22, the supply line 24, a first gas outlet 28, a first valve 30, a second gas outlet 32, a second valve 34, a third gas outlet 36, a third valve 38, and the piping 40. The suppression system 10 suppresses the release of the inactive gas from the gas cylinders 12a to 12c by sequentially releasing the first, the second, and the third gas cylinders 12a, 12b, and 12c, respectively, in order to control pressure release into the protected room 14 (shown in FIG. 1).

The first valve 30 is disposed at the first gas outlet 28 and controls a gas flow from the first gas cylinder 12a to the piping 40. The first valve 30 can be switched

between a closed position and an open position. When the first valve 30 is in the closed position, the gas from the first gas cylinder 12a cannot flow to the piping 40 by passing through the first gas outlet 28. When the first valve 30 is in the open position, the gas from the first gas cylinder 12a can flow from the first gas cylinder to the piping 40 by passing through the first gas outlet 28. Since the first valve 30 is opened by a command from the control panel 20, it can be operated electrically, pneumatically, or manually (shown in FIG. 1). If the control panel 20 is not functioning normally, the first valve 30 is opened manually. In one embodiment, the first valve 30 is a solenoid valve.

The second gas outlet 32, the second valve 34, the second gas cylinder 12b, and the piping 40 interact and function similarly to the first valve 30, the first gas outlet 28, the first gas cylinder 12a, and the piping 40. Moreover, the third gas outlet 36, the third valve 38, the third gas cylinder 12c, and the piping 40 interact and function similarly to the first valve 30, the first gas outlet 28, the first gas cylinder 12a, and the piping 40.

The piping 40 of the suppression system 10 includes a first intermediate line 40a, a second intermediate line 40b, and a third intermediate line 40c. The first intermediate line 40a is disposed between the main valve 22 and the first rupture disc 16a. The first gas outlet 28 connects the first gas cylinder 12a to the piping 40 by the first intermediate line 40a. The second intermediate line 40b is disposed between the first rupture disc 16a and the second rupture disc 16b. The second gas outlet 32 connects the second gas cylinder 12b to the piping 40 by the second intermediate line 40b. The third intermediate line 40c is disposed between the second rupture disc 16b and the third gas cylinder 12c. The third gas outlet 36 connects the third gas cylinder 12c to the piping 40 by the third intermediate line 40c.

The main valve 22 is disposed between the piping 40 and the supply line 24 and controls the release of the gas from the gas cylinders 12a to 12c through the first intermediate line 40a of the piping 40. When the main valve 22 is powered off or deactivated (closed), the gas cannot go out of the piping 40. When the main valve 22 is operated (opened), the gas can go into the protected room 14 through the piping 40. The main valve 22 can be activated electrically or manually. When the main valve 22 is operated electrically, the main valve 22 is opened by the command from the control panel 20 (shown in FIG. 1). If the control panel 20 is not functioning properly, the main valve 22 can function manually by ignoring it. In one embodiment, the main valve 22 is a solenoid valve.

The first rupture disc 16a is disposed along the piping 40 between the first

intermediate line 40a and the second intermediate line 40b and controls the release of the gas from the second gas cylinder 12a through the first intermediate line 40a to the protected room 14. The first rupture disc 16a controls the release of the gas from the second gas cylinder 12b by acting as a barrier between the second gas outlet 32 and the supply line 24. When the first rupture disc 16a is intact, the gas cannot pass from the second gas cylinder 12b to the supply line 24. Upon rupture of the first rupture disc 16a, the gas freely passes from the second gas outlet 32 through the first rupture disc 16a and the first intermediate line 40a to the supply line 24. The first rupture disc 16a ruptures as a function of a pressure difference between the first intermediate line 40a and the second Intermediate line 40b, which is based on the pressures in the first gas cylinder 12a and the second gas cylinder 12b. As the gas goes out of the first gas cylinder 12a, and the pressure in the first gas cylinder 12a decreases, the pressure difference of the first rupture disc 16a increases. When the pressure difference between the first intermediate line 40a and the second intermediate line 40b reaches a predetermined value, the first rupture disc 16a ruptures.

The second rupture disc 16b is disposed along the piping 40 between the second intermediate line 40b and the third intermediate line 40c and controls the release of the gas from the third gas cylinder 12c through the first and the second intermediate lines 40a and 40b to the protected room 14. The second rupture disc 16b functions in the same manner as the first rupture disc 16a and acts as a barrier between the third gas outlet 38 and the supply line 24. When the second rupture disc 16b is intact, the gas cannot pass from the third gas cylinder 12c to the main valve 22. Upon rupture of the second rupture disc 16b, the gas freely passes from the third gas outlet 36 through the second rupture disc 16b, the second intermediate line 40b, the first rupture disc 16a, and the first intermediate line 40a to the supply line 24. The second rupture disc 16a ruptures as a function of a pressure difference between the third intermediate line 40c and the first and the second intermediate lines 40a and 40b, which is based on the pressures in the third gas cylinder 12c and the first and the second gas cylinders 12a and 12b. The rupture discs 16 can be manufactured to have various rupture limits and rupture at an arbitrary pressure difference depending on a delay desired between ignition of the gas cylinders 12a to 12c. In one embodiment, the rupture discs 16 are burst discs. The rupture discs 16 can be any type of barriers that break or open as a function of a pressure difference without departing from the intended scope of the present invention."

(Original: line 18, page 3 to line 19, page 6, translation: pages 3 to 5)

D "When the main valve 22 is operated (opened), the gas can flow from the first gas

cylinder 12a through the first intermediate line 40a, the main valve 22, and the supply line 24 into the protected room 14. When the gas is released into the protected room 14 from the first gas cylinder 12a, the pressure in the first gas cylinder 12a decreases, and the pressure in the first intermediate line 40a is attenuated, and since the pressure in the second intermediate line 40b remains constant, a pressure difference applied to the first rupture disc 16a begins to increase. As the pressure in the first intermediate line 40a continues to attenuate, the pressure difference at the first rupture disc 16a eventually reaches a predetermined level, and the first rupture disc 16a reaches its rupture limit. When the first rupture disc 16a reaches its rupture limit, the first rupture disc 16a ruptures, whereby the gas from second gas cylinder 12b flows through the second intermediate line 40b and the first rupture disc 16a and merges with the gas from the first gas cylinder 12a.

After the first rupture disc 16a ruptures, the gas from the second gas cylinder 12b merges with the gas from the first gas cylinder 12a and goes out of the suppression system 10. The pressures of the first and the second gas cylinders 12a and 12b combine and quickly reach a new pressure equilibrium due to mutual filling of the gas. When the gas is released into the protected room 14, the total pressure of the first and the second gas cylinders 12a and 12b continuously decreases. Therefore, since the pressures in the first and the second intermediate lines 40a and 40b lower, and the pressure in the third intermediate line 40c remains constant, the pressure difference to the second rupture disc 16b begins to increase. When the pressures in the first and the second gas cylinders 12a and 12b decreases below a second predetermined level, the pressure difference to the second rupture disc 16b reaches a maximum limit, and the second rupture disc 16b reaches its rupture limit. Then, the second rupture disc 16b ruptures, and the gas from the third gas cylinder 12c can flow to the supply line 24, along with the gas from the first and the second gas cylinders 12a and 12b."

(Original: line 23, page 7 to line 18, page 8, translation: pages 6 to 7)

E "Although FIGS. 1 and 2 illustrate the suppression system 10 having the three gas cylinders and the two rupture discs, more gas cylinders and rupture discs may be used as necessary to appropriately protect the closed room without departing from the intended scope of the present invention. For example, if a fire in a sealed room needs to be appropriately suppressed, a plurality of gas cylinders may be mounted between the rupture discs. Moreover, if more gas cylinders are needed, more rupture discs may also be needed to ensure that overpressure does not occur in the sealed room. More gas cylinders and rupture discs may be needed depending on the size of

the protected room, the volume of the gas cylinder, and other factors."
(Original: lines 11 to 22, page 9, translation: page 8)
F "FIG. 4 is a graph of the pressure in a sealed room during the sequential release from the gas cylinders 12a to 12c as a function of time. As shown in FIG 4, the suppression system 10 releases the gas into the sealed room at a speed controlled so that the overpressure is not applied to the sealed room. When the main valve 22 is operated and the gas from the first gas cylinder 12a is released into the sealed room, there is a relatively high initial peak in a pressure P1 in the closed room, but the initial increase of the high pressure is still below a threshold limit specified in advance. When the gas in the first cylinder 12a is released, and the level of the gas remaining in the first gas cylinder 12a lowers, the pressure difference at the first rupture disc 16a increases and the first rupture disc 16a ruptures, and since the gas is released also from the second gas cylinder 12b, a second peak is generated in a pressure P2 in the sealed room. Then, as the level of the gas remaining in the first and the second gas cylinders 12a and 12b lowers, the pressure in the sealed room continues to decrease. When the gas from the first and the second gas cylinders 12a and 12b is released into the sealed room, the pressure difference applied to the second rupture disc 16b increases until the second rupture disc 16b ruptures, and the gas is released also from the third gas cylinder 12c, causing a third pressure peak P3 in the sealed room. The gas continues to be released from the gas cylinders 12a to 12c until a nominal amount of gas is left in the suppression system 10 and no more gas is released.

The numbers and values of pressure peaks P1, P2, and P3 depend on the number of gas cylinders and their volumes. In compliance with various fire codes, the gas in an amount required for suppressing a fire or other hazards in a sealed room needs to be released into the sealed room within 60 seconds. As shown in FIG. 4, even with a time delay among the pressure peaks P1, P2, and P3, all the gas is released from the suppression system 10 within 60 seconds. The time delays among the pressure peaks P1, P2, and P3 are controlled on the basis of the pressure difference required to rupture the rupture discs 16 and can be manufactured so as to meet any specification. An optimal pressure difference varies depending on the size of the room, the number of gas cylinders, the volumes of the gas cylinders, and the time delay required between sequential ignitions of the gas cylinders. In one embodiment, the pressure difference required to rupture the rupture discs 16 is between approximately 15 bar and 50 bar."
(Original: line 22, page 9 to line 23, page 10, translation: pages 8 to 9)
G "The fire-hazard suppression system with sequential release of the present

invention efficiently prevents overpressure in a protected room at the release, while reducing equipment, installation costs, and maintenance costs. The fire-hazard suppression system automatically releases the inactive gas and controls the flowrate of the released inactive gas by disposable rupture discs as a function of the pressure difference between the rupture discs without using an expensive throttling valve. When the main valve is operated, the gas from the first gas cylinder is released into the protected room. When the pressure from the first gas cylinder attenuates, the first rupture disc acting as a barrier between the first gas cylinder and the second gas cylinder ruptures due to the pressure difference, and the gas from the second gas cylinder is also released into the protected room. Regarding the pressures in the first and the second gas cylinders, the combined pressure quickly reaches equilibrium due to the gas cross-charging and forms a new pressure. When the new pressure of the first and the second gas cylinders attenuates, the second rupture disc between the second gas cylinder and the third gas cylinder ruptures due to the pressure difference, and the gas from the third gas cylinder enters the protected room. The gas from all the three gas cylinders is continuously released into the protected room until only a small amount of gas is left in the suppression system."
(Original: line 24, page 10 to line 10, page 11, translation: page 9)
H "CLAIMS:
1. A controlled pressure release system for preventing overpressure in a protected region when a gas is supplied from a plurality of gas containers, comprising:

a first gas container;

a second gas container;

a piping in contact with the first and the second gas containers, the piping having a release port;

a first gas outlet and a second gas outlet connecting the first gas container and the second gas container to the piping respectively;

a first differential-pressure responsive valve disposed between the first and the second gas outlets; and

a valve for operating the system, the valve being switchable between a closed position and an open position, wherein when the valve switches to the open position, the first gas container communicates with the release outlet, and the first differential-pressure responsive valve opens in accordance with lowering of a gas pressure in the first gas container.

2. The system according to claim 1, wherein

a first gas pressure in the first gas container is substantially equal to a second gas pressure in the second gas container when the valve is at the closed position.

3. The system according to claim 1, wherein

the first differential-pressure responsive valve includes a first rupturable disc.

(Original: lines 1 to 25, page 12, translation: page 10)

(3) Presence/absence of errors in determination on how easily it could have been conceived of relating to Difference 1

In the present decision, regarding Difference 1, it was determined that [i] a person ordinarily skilled in the art who contacted Exhibit Ko 2 Technical Matters could have easily recognized that, in the "automatic-start type" Exhibit Ko 1 Invention including the "plurality of nitrogen-gas storage containers with container valves", in order to prevent release of the "nitrogen gas" into the protected section in a state where the excessive pressure is applied, it is only necessary to sequentially release the nitrogen gas into the protected section at the speed controlled so that the excessive pressure is not applied; [ii] Exhibit Ko 2 Technical Matters realize that "sequential release into the protected room 14 at the speed controlled so that the excessive pressure is not applied" by shifting the opening time of the "main valve 22", the "rupture disc 16a", and the "rupture disc 16b", but in the "automatic-start type" Exhibit Ko 1 Invention including the "plurality of nitrogen-gas storage containers with the container valves", a person ordinarily skilled in the art could have normally predicted that the sequential release to the protected section at the speed controlled so that the excessive pressure of the nitrogen gas is not applied can be realized by shifting the valve-opening timing of the "container valve" attached to each of the "nitrogen-gas storage containers" even without using the rupture disc or the like; [iii] by considering the description in paragraph [0025] in the present description, it cannot help but be interpreted that the term "determines" in "determines first valve-opening timing of the container valve of the one container and second valve-opening timing of the container valve of the other container, which is different from the first valve-opening timing and prevents the overlap of the peak pressures of the extinguisher gas" only means that the valve-opening timing is determined by a signal from the control portion, and the timing set such that "first valve-opening timing of the container valve of the one container and second valve-opening timing of the container valve of the other container, which is different from the first valve-opening timing and prevents the overlap of the peak pressures of the extinguisher gas" is only inevitable timing for realizing the sequential release into the protected section at the speed controlled so

that the excessive pressure of the nitrogen gas is not applied by shifting the valve-opening timing of the "container valve" attached to each of the "nitrogen-gas storage containers", and thus, a person ordinarily skilled in the art could have also easily conceived of "a control portion which determines first valve-opening timing of the container valve of the one container and second valve-opening timing of the container valve of the other container, which is different from the first valve-opening timing and prevents the overlap of the peak pressures of the extinguisher gas and is connected to each of the container valves is further provided"; [iv] in view of the described matters in Exhibits Ko 7 and Ko 8, "in an extinguishment facility including a plurality of extinguisher gas containers and introducing the extinguisher gas via introducing means such as a piping into a protected section, the extinguisher gas is introduced into the protected section by shifting valve-opening timings of a container valve of one container in the plurality of the extinguisher gas containers and the container valve of another container, and the valve-opening timing of the container valve is determined by a control portion" can be found to be a well-known art before the present application in the technical field of the gas-system extinguishment facilities; and [v] it should be considered that a person ordinarily skilled in the art who contacted Exhibit Ko 2 Technical Matters could have easily conceived of, in the Exhibit Ko 1 Invention, the invention specifying matters (configuration) of the present invention relating to Difference 1 by shifting the valve-opening timing of the "container valve" attached to each of the "nitrogen-gas storage containers".

However, the determination in the present decision is erroneous, as follows.

A [i] and [ii]

(A) According to the described matters in Exhibit Ko 1 in (1) described above, Exhibit Ko 1 has, as a configuration example of the nitrogen extinguishment facility, description of a plurality of nitrogen-gas storage containers with "container valves" installed in a storage container room and describes that the number (N) of the storage containers is the number acquired by dividing the required extinguisher amount W(m^3) by a filled amount per storage container.

On the other hand, Exhibit Ko 1 does not have description or suggestion on the valve-opening timing of the container valve of each of the storage containers or that the nitrogen gas is introduced into the protected section by preventing the overlap of the peak pressures of the nitrogen gas released from the one storage container and the other storage container.

(B) Subsequently, according to the described matters in Exhibit Ko 2 in (2) described above, Exhibit Ko 2 is found to have Exhibit Ko 2 Technical Matters described ("in a

fire-hazard suppression system 10 including a plurality of high-pressure inactive-gas storage cylinders 12a to 12c containing an inactive gas, a rupture disc 16a disposed along a piping 40 between the gas cylinders 12a and 12b and a rupture disc 16b disposed along the piping 40 between the gas cylinders 12b and 12c, a supply line 24 and an ejection nozzle 26 which release the inactive gas into a protected room 14 such as a data center, a computer room and the like including valuable devices or components, and a ventilation port provided in the protected room 14 in order to prevent an excessive pressure, by shifting opening time of a main valve 22 disposed between the piping 40 and the supply line 24, the rupture disc 16a disposed along the piping 40 between the gas cylinders 12a and 12b, and the rupture disc 16b disposed along the piping 40 between the gas cylinders 12b and 12c, because a point of time when gas supply from the cylinder 12a is started, a point of time when the gas supply from the cylinder 12b is started, and a point of time when the gas supply from the cylinder 12c is started are shifted, the inactive gas is sequentially released into the protected room 14 at a speed controlled so that the excessive pressure is not applied.")

However, the "rupture disc" in Exhibit Ko 2 Technical Matters is a disposable member (Exhibits Ko 21 to 23) which operates (ruptures) by a pressure determined in advance inside a piping or the like, and once it operates (ruptures), it is not closed again, and an operation and a function are different from those of the "container valve" in which the valve is repeatedly opened/closed.

According to Exhibit Ko 2 described matters in (2) described above, Exhibit Ko 2 is found to have a disclosure that [i] in the fire-hazard suppression system described in Exhibit Ko 2, a rupture disc is mounted between a plurality of (first and second) gas cylinders, and when a gas in the first gas cylinder is released into a protected room (sealed room), and a level of the remaining gas in the first gas cylinder lowers, the rupture disc ruptures by a pressure difference between the first and the second gas cylinders, the gas in the second gas cylinder is released into the protected room, and by means of the sequential release of the gas from the plurality of gas cylinders, respectively, as above, overpressure of the protected room can be prevented ((2) D, G described above), [ii] depending on the size of the protected room, the capacity of the gas cylinder, and the other factors, the closed room (protected room) can be properly protected by using more gas cylinders and rupture discs as necessary ((2) E, F described above).

On the other hand, although Exhibit Ko 2 has the description that a gas flow from the gas cylinder to the piping is controlled by opening/closing of the valve (the first valve 30, the second valve 34, and the third valve 38 described in FIG. 2), it is

the description on the premise that the rupture disc is used, and it does not have description or suggestion that pressurization of the protected region or the protected room is prevented by sequentially releasing the gas from each of the plurality of gas cylinders by shifting the valve-opening timing of each of the valves without using the rupture discs.

(C) As described above, from the viewpoints that the "container valve" of the nitrogen-gas storage container with the "container valve" described in Exhibit Ko 1 and the "rupture disc" in Exhibit Ko 2 Technical Matters have different operations and functions, and neither Exhibit Ko 1 nor Exhibit Ko 2 has description or suggestion on prevention of the pressurization of the protected area or the protected room by sequentially releasing the gas from each of the plurality of gas cylinders by shifting the valve opening/closing timing of the container valve of the storage container or the valve of the gas cylinder, even if a person ordinarily skilled in the art who contacted Exhibits Ko 1 and Ko 2 could have conceived of application of the rupture disc described in Exhibit Ko 2 in order to prevent the pressurization of the protected area or the protected room in Exhibit Ko 1 invention, it cannot be approved that the person ordinarily skilled in the art could have easily conceived that prevention of the pressurization can be realized by sequentially releasing the gas from each of the plurality of gas cylinders by shifting the valve-opening timing of the "container valve" attached to each of the "nitrogen-gas storage containers" without using the rupture disc.

Therefore, the determination on [i] and [ii] in the present decision is erroneous.

B Regarding [iii]

In the determination on [ii] in the present decision, on the grounds that it cannot help but to be interpreted that the term "determines" in "determines first valve-opening timing of the container valve of the one container and second valve-opening timing of the container valve of the other container, which is different from the first valve-opening timing and prevents the overlap of the peak pressures of the extinguisher gas" in the present invention only means that the valve-opening timing is determined by a signal from the control portion, in the Exhibit Ko 1 Invention including the control portion connected to the container valve, it is interpreted that a person ordinarily skilled in the art could have also easily conceived that "a control portion which determines first valve-opening timing of the container valve of the one container and second valve-opening timing of the container valve of the other container, which is different from the first valve-opening timing and prevents the

overlap of the peak pressures of the extinguisher gas and is connected to each of the container valves is further provided" (a part of the configuration of the Present Invention 1 relating to Difference 1), but it is logically unreasonable to immediately derive the conclusion as above from claim construction of the term "determines" in Present Invention 1, and logical grounds are insufficient.

C Regarding [iv]

Assuming that, from the description in Exhibits Ko 7 and Ko 8, "in an extinguishment facility including a plurality of extinguisher gas containers and introducing the extinguisher gas via introducing means such as a piping into a protected section, the extinguisher gas is introduced into the protected section by shifting valve-opening timings of a container valve of one container among the plurality of the extinguisher gas containers and the container valve of another container, and the valve-opening timing of the container valve is determined by a control portion" can be found to be well-known before the present application in the technical field of the gas-system extinguishment facilities as stated in the present decision, there is no evidence or logical grounds sufficient to find that a person ordinarily skilled in the art is motivated to apply the aforementioned well-known art to the Exhibit Ko 1 invention.

D Conclusion

As described above, since it cannot be found that a person ordinarily skilled in the art could have easily conceived of having the configuration of the present invention relating to the Difference 1 in the Exhibit Ko 1 Invention on the basis of Exhibit Ko 1, the Exhibit Ko 2 Technical Matters, and the well-known art described above, the determination on the present decision different from this is erroneous.

(4) Assertion by Defendant

The Defendant asserts that [i] Exhibit Ko 2 presents, as a problem, release of an inactive gas at a speed controlled so that an excessive pressure is not applied, and as means for solving the problem, such a technical matter is described that timings for starting gas supply from a plurality of cylinders (timing to start the gas supply from the cylinder 12a, the timing to start the gas supply from the cylinder 12b, and the timing to start the gas supply from the cylinder 12c) are shifted (lines 22 to 26 on page 9), but the "rupture disc" described in Exhibit Ko 2 Technical Matter is only means for that; [ii] the means for introducing an extinguisher gas into a protected section by shifting valve-opening timings of the plurality of extinguisher gas containers by the control portion was well known in the technical field of the gas-system extinguishment facilities before the present application (Claim 1, paragraphs

[0001], [0014] in Exhibit Ko 7, paragraphs [0001], [0014], [0018] in Exhibit Ko 8); [iii] from the description in Exhibits Otsu 5 and 6, it was well-known before the present application that the rupture disc and the controlled opening/closing valve have the same function; [iv] in Exhibit Ko 1, the description that "in order to alleviate a pressure inside a section which rises by emission of the extinguisher into the protected section, a pressure relief port should be installed properly" and on a calculation equation for a required area for the pressure relief port proves that the Exhibit Ko 1 Invention was made under the problem of preventing an excessive pressure applied to the protected section and thus, a person ordinarily skilled in the art who contacted Exhibit Ko 1 would understand presence of the problem of preventing the excessive pressure in the Exhibit Ko 1 Invention, and in order to solve the problem, a person ordinarily skilled in the art could have easily conceived of application of the "technical idea of shifting the point of time to start the gas supply from the plurality of cylinders" in the Exhibit Ko 2 Technical Matter and, at the application, shifting of the valve-opening timing of the "container valve" attached to each of the "nitrogen-gas storage containers" in the Exhibit Ko 1 Invention by employing the well-known means that the extinguisher gas is introduced into the protected section by shifting the valve-opening timings of the plurality of extinguisher gas containers by the control portion and moreover, the "rupture disc" is only means for shifting the points of time to start the gas supply from the plurality of cylinders, and presence of the difference in the function and effect between the art using the rupture disc and the art using the container valve asserted by the Plaintiff cannot hinder the application of the "technical idea of shifting the points of time to start the gas supply from the plurality of cylinders" in the Exhibit Ko 2 Technical Matter to the Exhibit Ko 1 Invention and thus, the person ordinarily skilled in the art could have easily conceived of having the configuration of the Present Invention relating to Difference 1 in the Exhibit 1 Invention on the basis of Exhibit Ko 1, the Exhibit 2 Technical Matters, and the well-known arts before the present application.

However, regarding [i] and [iv], as described in the aforementioned (3)A(B), although Exhibit Ko 2 has the description on control of the gas flow from the gas cylinder to the piping by opening/closing of the valves (the first valve 30, the second valve 34, the third valve 38 described in FIG. 2), it is a description on the premise that the rupture disc is used, and from the viewpoint that there is no description or suggestion on the sequential release of the gas from each of the plurality of gas cylinders by shifting the valve-opening timing of each valve without using the rupture disc so as to prevent pressurization of the protected area or the protected room, it

should be impossible to read the "technical idea of shifting the points of time to start the gas supply from the plurality of gas cylinders" without using the rupture disc from the Exhibit Ko 2 Technical Matter.

Therefore, the aforementioned assertions [i] and [iv] by the Defendant lack the premises thereof and cannot be employed.

Moreover, regarding [ii], as described in the aforementioned (3)C, even if the means for introducing the extinguisher gas into the protected section by shifting the valve-opening timings of the plurality of extinguisher gas containers by the control portion was well-known in the technical field of gas-system extinguishment facilities before the present application, there is no evidence or logical grounds sufficient to find that a person ordinarily skilled in the art is motivated to apply the aforementioned well-known art to the Exhibit Ko 1 Invention.

Moreover, regarding [iii], as described in the aforementioned (3)A(C), from the viewpoint that the "container valve" of the nitrogen-gas storage container with the "container valve" described in Exhibit Ko 1 and the "rupture disc" in the Exhibit Ko 2 Technical Matter have different operations and functions, the aforementioned finding is not affected even by considering the description in Exhibit Otsu 5 asserted by the Defendant (lines 7 to 10, page 2, FIG. 2) and the description in Exhibit Otsu 6 (lines 1 to 19, upper left column on page 3, FIGS. 8 to 10).

Therefore, none of the assertions by the Defendant is grounded.

(5) Summary

According to the above, since the determination on how easily it could have been conceived of in Difference 1 in the present decision is erroneous, even without needing to determine the other points, it cannot be found that a person ordinarily skilled in the art could have easily conceived of the Present Invention on the basis of Exhibits Ko 1 and 2 and the well-known matters.

Therefore, the grounds for rescission asserted by the Plaintiff are grounded.

3 Conclusion

As described above, the grounds for rescission asserted by the Plaintiff are grounded, and the part that "the patent for the claim 1 of Patent No. 6674704 shall be revoked" shall be rescinded and thus, the judgment shall be rendered as in the main text.

Intellectual Property High Court, First Division

Presiding Judge: OTAKA Ichiro

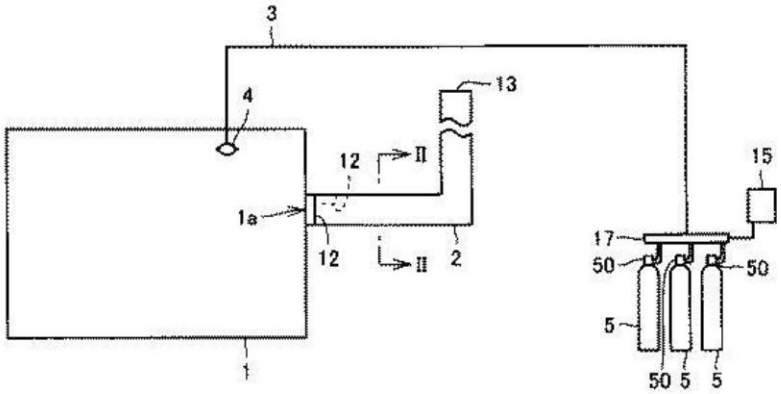
Judge: OGAWA Takatoshi

Judge: TOYAMA Atsushi

(APPENDIX 1) PRESENT DESCRIPTION

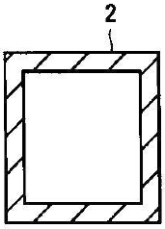
[FIG. 1]

FIG. 1



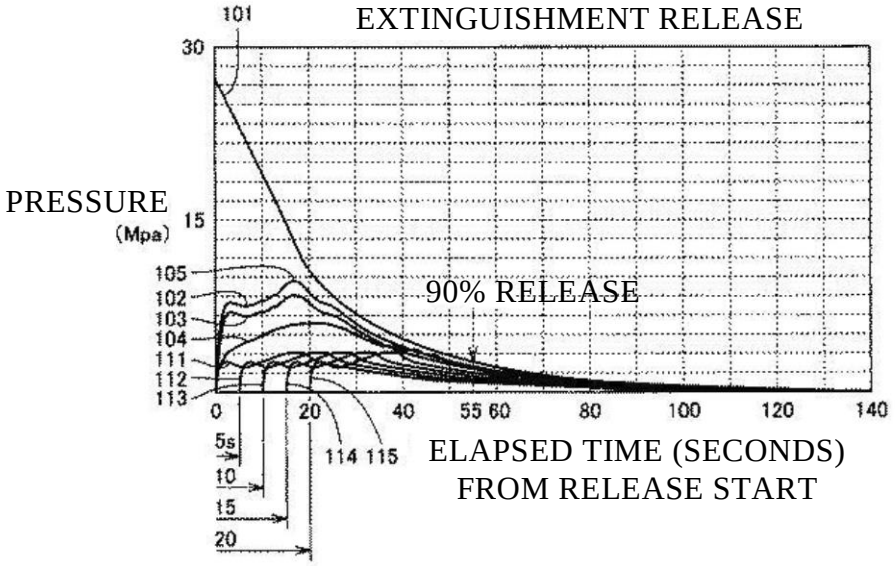
[FIG. 2]

FIG. 2



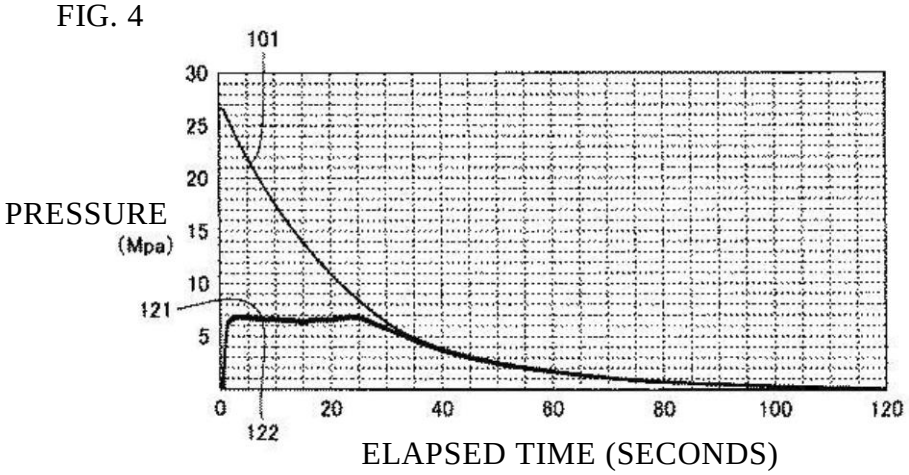
[FIG. 3]

FIG. 3 PRESSURE CHANGE AT NITROGEN EXTINGUISHMENT RELEASE



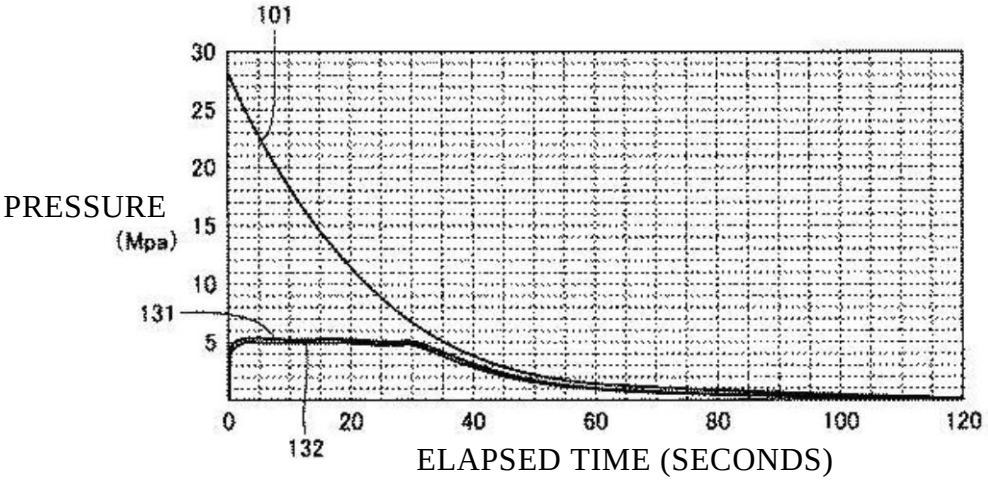
[FIG. 4]

FIG. 4



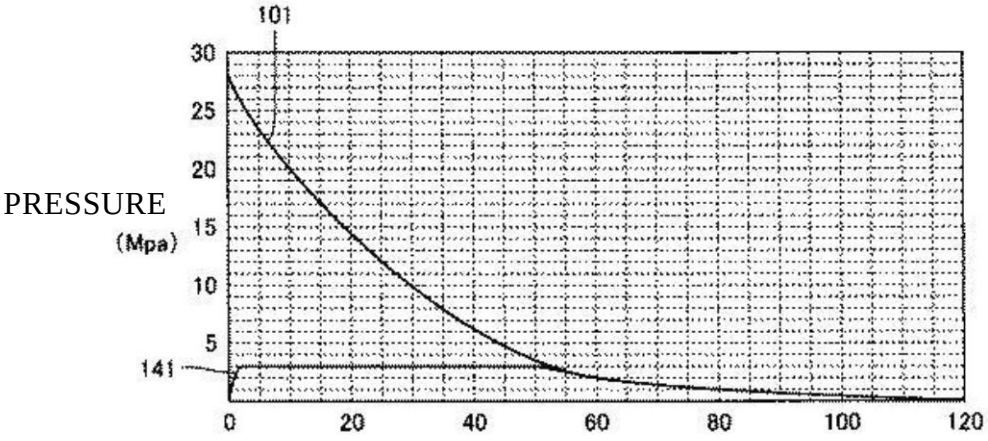
[FIG. 5]

FIG. 5



[FIG. 6]

FIG. 6



(APPENDIX 2) EXHIBIT KO 1

FIG. 9.6.1.2

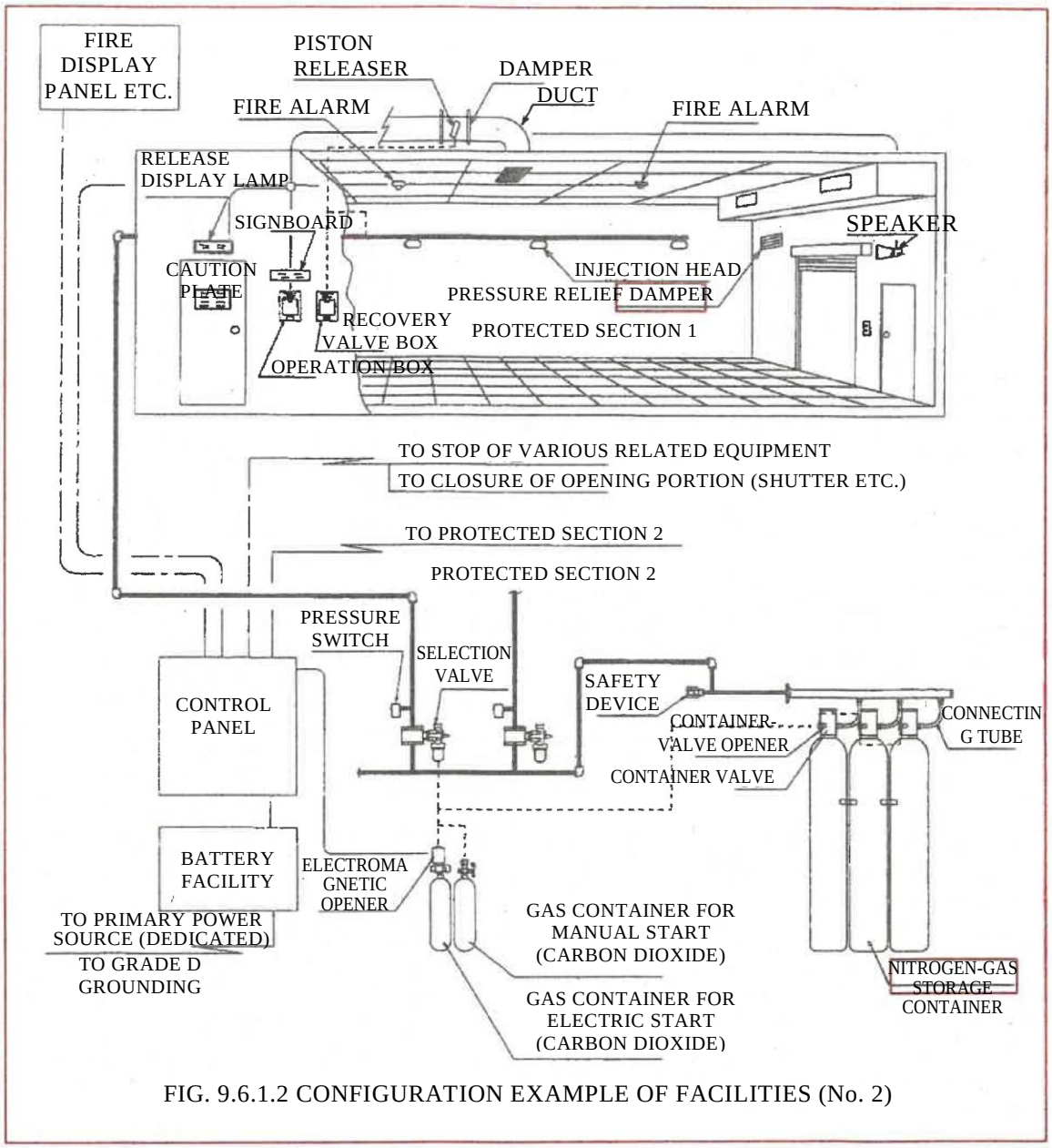


FIG. 9.6.1.2 CONFIGURATION EXAMPLE OF FACILITIES (No. 2)

FIG. 9.6.2.8

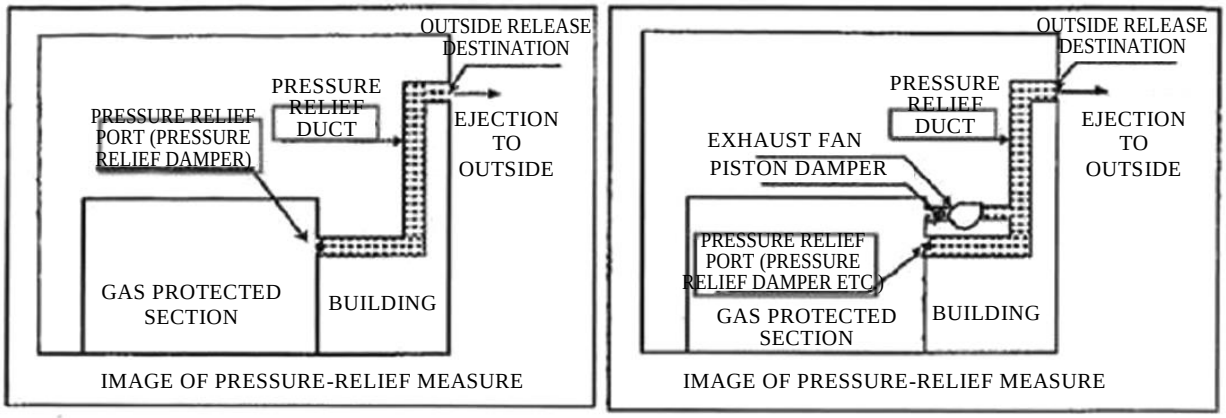


FIG. 9.6.2.8 EXAMPLE OF PRESSURE RELIEF MEASURE (DUCT PATH)

(APPENDIX 3) EXHIBIT KO 2

[FIG. 1]

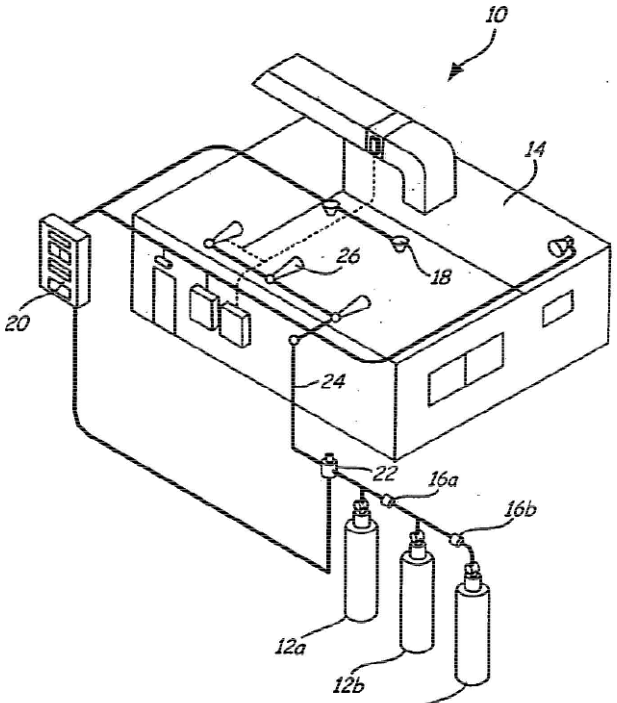


FIG. 1

[FIG. 2]

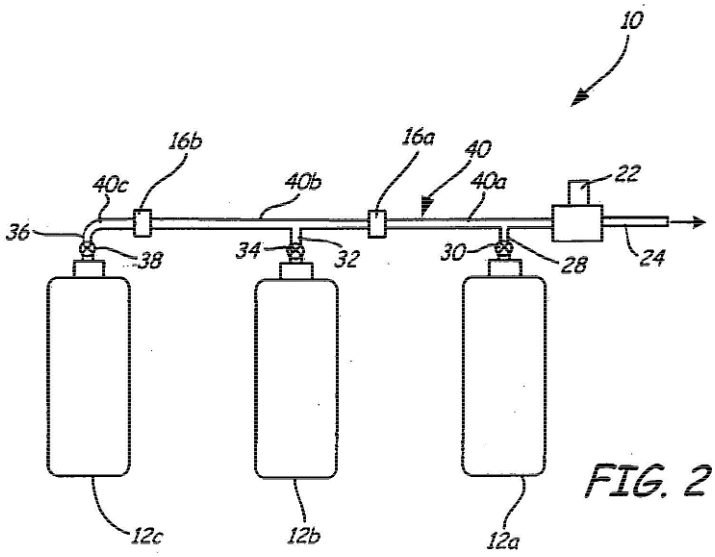


FIG. 2

[FIG. 4]

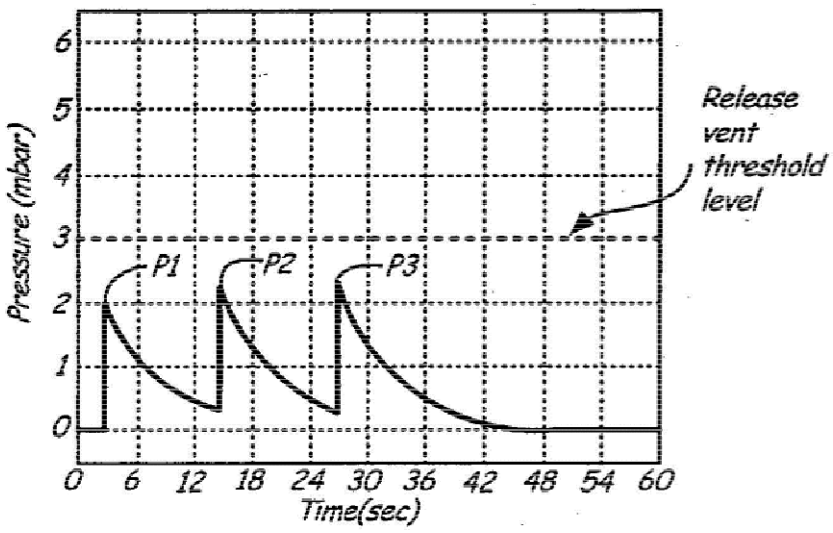

Pressure (mbar)
6
5
4
3
2
1
0
P1
P2
P3
Release vent threshold level
0 6 12 18 24 30 36 42 48 54 60
Time(sec)

FIG. 4