

UNITED STATES PATENT OFFICE.

NATHAN SULZBERGER, OF NEW YORK, N. Y.

METHOD OF PREVENTING FIRES.

SPECIFICATION forming part of Letters Patent No. 764,964, dated July 12, 1904.

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To all whom it may concern:

Be it known that I, NATHAN SULZBERGER, a citizen of the United States, residing in New York, borough of Manhattan, and State of New York, have invented certain new and useful Improvements in Methods of Preventing Fires, of which the following is a specification.

This invention relates to an improved method of preventing fires and of quickly extinguishing the same by the use of carbonic-acid gas, the method being specially applicable to warehouses, grain-elevators, storage-rooms, and all such other rooms and buildings in which little or no traffic is going on, such as buildings and residences which are locked up for a time during the year or in factories or departments of same where there is no work done during a longer or shorter part of the day or night or during certain times of the year and also all other rooms and spaces which can be sufficiently shut off from the outside atmosphere so that in the same the air can be sufficiently charged with carbonic-acid gas to prevent or extinguish combustion.

In the previous uses of carbonic acid the gas was used more for extinguishing than for preventing fires, which caused a certain loss of time, since it required first the discovery and location of the fire and then the charging of the atmosphere with a sufficient amount of gas for extinguishing the fire. Besides this, the constant watching of the buildings was necessary, either by expensive watchmen or some automatic alarm device, taking risks with the latter of being out of order when most needed. This loss of time occurring at the starting of the fire, where the first few minutes in extinguishing fires are most valuable, makes the use of carbonic-acid gas as a preventive superior to the use of the same for extinguishing fires. It is also much more difficult to extinguish a fire after it has once started than to prevent it by a gas which is a great deal heavier than the atmospheric air, as the hottest flames are naturally sought by the lightest gases, which generally are the most suitable for sustaining combustion. These gases shut off for the time being the heavier gases and among them, of course, the carbonic-acid gas and where it is most needed.

Heavy gases also will first spread nearer to the floor, the higher layers of the atmosphere in the rooms only being reached after the lower layers are saturated. Thus when the gas is introduced after a fire has started the spreading of the fire will not be so quickly checked, owing to the starting up of the spreading flames. Again, as a fire rarefies the atmosphere the amount of air which a room or space contains (the atmospheric pressure of course does not change) is gradually diminished the higher the temperature of the room. In this case there would be less oxygen present; but as bodies can get the supply of oxygen necessary for their combustion from other than atmospheric sources if certain oxygen-containing bodies be present, as is generally the case, it will take less time to charge an atmosphere with carbonic-acid gas to such an extent that combustion becomes impossible when the atmosphere already contains some of this gas, and there is therefore but a small chance that these high temperatures will ever be reached.

The invention consists, therefore, in establishing in the rooms or spaces to be protected against fire an atmosphere of carbonic-acid gas and sustaining this atmosphere by an additional supply of gas from time to time and in case of a fire by an extra supply of carbonic acid, so as not only to prevent the starting of a fire, but extinguish the same when once started. To this atmosphere may be added some penetrant odoriferous substance, which serves as a warning to the senses that the rooms or spaces are protected against fire by a fire-preventive gaseous fluid.

For the purpose of preventing fires rooms and buildings are equipped with a system of pipes which are connected with a reservoir or with individual cylinders containing liquefied or compressed carbonic acid, or they are connected with any other source of supply of this gas. Any pipe-lines which are already in the rooms or buildings can be used for conveying this gas, such as the common gas-pipes when electricity has been installed; further, the pipes used in connection with a sprinkler system, and in some cases, perhaps, even the water-pipes. These pipes can be perforated

wherever the quick emission of the carbonic-acid gas is desired and valves be set on them at suitable places. When such pipes are laid for the purpose of using the fire-extinguishing properties of carbonic-acid gas, it might be well to put them as much as possible on the outside of the building, as there is no danger of their freezing up, guarding thereby against dangerous leaks inside of the buildings as much as possible. The valves should be best so set that the flow of the gas can be regulated as well from the outside as from the inside of each individual room. Between the source of the gas and the pipe system carrying the gas to the place of use may be inserted a pressure-reducing valve, so that from this valve on very thin piping can be used. It is best to have each room on a separate valve, so that the gas can be supplied to any one room, while the other rooms are cut out or not, as desired.

As carbonic acid is poisonous to human and animal life, the same is odorized with any suitable and easily-detected odor, which of course will vary as to the goods stored—such as peppermint, musk, creosote, &c.—so as to warn persons of the presence of the gas in these rooms through leakage or otherwise, or the rooms in which such an atmosphere is kept up can so be odorized.

In order to prevent any chance fire from starting, it is necessary not only to create an atmosphere of carbonic-acid gas, but to keep it up continuously by adding so much of the carbonic-acid gas to the air in such rooms that combustion becomes impossible, and in order that the atmosphere may remain in this fire-preventive condition it will be necessary either to supply a small continuous stream of this gas to the rooms or buildings or let at least from time to time a quantity of fresh gas into the same, since there will always be a tendency in this artificial atmosphere to change into the natural condition of the atmosphere on the outside of the buildings, thereby lessening its amount of carbonic-acid gas.

A convenient way of ascertaining the desired conditions existing in these rooms is to see if a lighted match or a light is extinguished when held in this atmosphere, or the same can be tested by pushing an electric button on the outside of the room for lighting a gas-flame at the inside of the same, thus avoiding a disturbance of the atmosphere in these rooms while watching the non-lighting or lighting of the flame from the outside through a glass window.

Whenever it becomes necessary—as, for instance, when work has to be done in such rooms—to change the atmosphere or carbonic acid into sweet fresh air, this can easily be done by permitting the ingress of atmospheric air through an opening into the rooms and waiting until by the diffusion of the outside and inner atmosphere the carbonic-acid gas

has escaped automatically or by connecting such rooms by a large pipe with a suction-fan or other draft-producing appliance. When a building—storage or warehouse, for instance—is erected in connection with my method of preventing fires by carbonic-acid atmosphere, all the rooms in the same could be connected up for the sake of quickly charging this atmosphere into fresh air by a large pipe or directly with a shaft, at the top of which would be placed a suitable draft-producing appliance. At another place in the room there would be an opening communicating with the outside fresh air. Such opening of course would be tightly closed up ordinarily and could be closed and opened from the outside, so as not to necessitate the entrance to the room. Everything would be so arranged and constructed as to make it possible to change the atmosphere in one room without affecting the others. In some cases the elevator-shafts could be arranged so as to be used for the changing of the atmosphere in the rooms, so that an additional shaft would not be necessary.

Since carbonic-acid gas is known to possess a certain antiseptic value, preventing the action of many germs and ferments which require the presence of oxygen, and since all animals and vermin—such as rats, bugs, moths, &c.—cannot live in such an atmosphere an atmosphere of carbonic-acid gas outside of its fire-extinguishing properties, can be advantageously used in all rooms where goods are stored which are liable to damage from these sources, such as furs, grain, fruits, and other perishable products.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The method herein described of preventing fires, which consists in establishing a permanent atmosphere of carbonic-acid gas in the rooms to be protected, substantially as set forth.

2. The method herein described of preventing fires, which consists in establishing in the rooms to be protected an atmosphere of carbonic-acid gas, and sustaining said atmosphere by supplying intermittently or continuously an additional quantity of carbonic-acid gas to said rooms, substantially as set forth.

3. The method herein described of preventing fires, which consists in establishing a permanent atmosphere of carbonic-acid gas in the rooms to be protected, and impregnating said atmosphere with an odoriferous substance so as to act as a warning against danger, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

NATHAN SULZBERGER.

Witnesses:

PAUL GOEPEL,
HENRY J. SUHRBIER.