No. 730,807. PATENTED JUNE 9, 1903.

M. TOLTZ & A. LIPSCHUTZ.

GAS DISTRIBUTING SYSTEM.

APPLICATION FILED SEPT. 10, 1902.

NO MODEL.

Fig. 1.

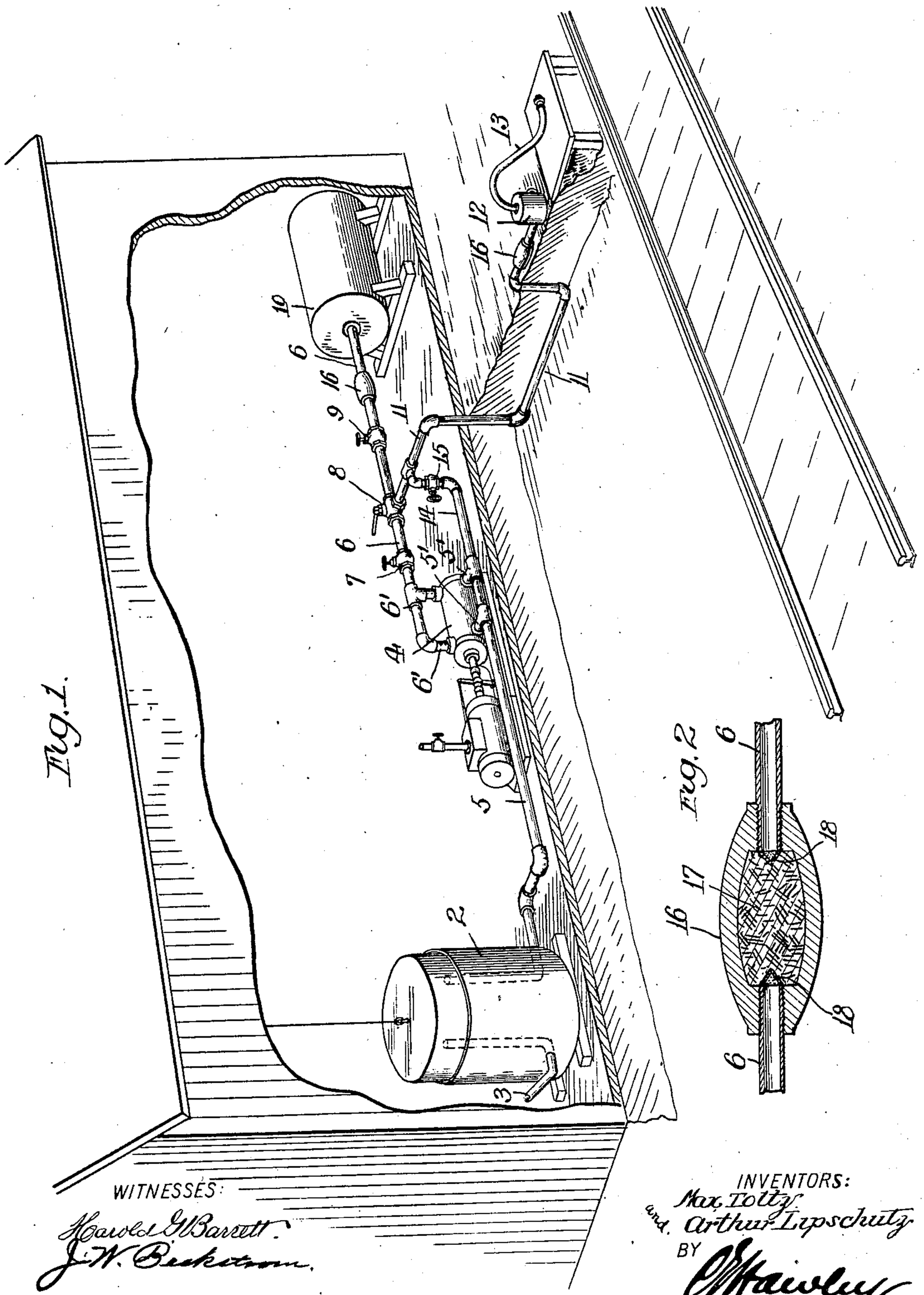

Fig. 2.

WITNESSES:

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No. 730,807. Patented June 9, 1903.

UNITED STATES PATENT OFFICE.

MAX TOLTZ, OF ST. PAUL, MINNESOTA, AND ARTHUR LIPSCHUTZ, OF ST. LOUIS, MISSOURI.

GAS-DISTRIBUTING SYSTEM.

SPECIFICATION forming part of Letters Patent No. 730,807, dated June 9, 1903.

Application filed September 10, 1902. Serial No. 122,769. (No model.)

To all whom it may concern:

Be it known that we, MAX TOLTZ, a resident of St. Paul, Ramsey county, Minnesota, and ARTHUR LIPSCHUTZ, a resident of St. Louis, Missouri, citizens of the United States, have invented certain new and useful Improvements in Acetylene-Gas-Lighting Systems, of which the following is a specification.

This invention relates to acetylene-gas systems, and particularly to compressed-acetylene-gas apparatus.

The object of the invention is to prevent disastrous explosions of gas in such systems.

The mere protection of acetylene-gas systems from the effect of local conflagrations that might heat the confined gas sufficiently to cause its dissociation has been outlined and provided for in the United States Patent No. 699,725, granted to us May 13, 1902; but so far as we are informed no means have previously been devised for protecting acetylene-gas systems against explosions that may be caused by internal heat or sparks within the gas containers or pipes, and this invention is of an entirely different character than that which was previously patented to us.

When a pipe or other member of a system containing acetylene gas under high pressure is exposed to a temperature equaling or exceeding 1,432° Fahrenheit or where heat is developed within the contained body of gas, dissociation occurs and is accompanied by disastrous explosive effects that are imparted to every connected part of the system. This last is due, primarily, to the high velocity of the explosion-wave in the body of compressed gas, and the communication of the dissociative action to all parts of the body of compressed gas is so rapid that external means—such as fusible pipe connections, safety-valves, or other external means—cannot be relied upon to free the gas and localize dissociation at a point remote far enough from the storage tank or tanks to prevent the explosion of the main body of gas. Unless this is done the explosion of the storage-tank is inevitable if a spark is struck in any pipe connected with the tank or if any part of the pipe is subjected to the high temperature named. An acetylene-gas system generally defined comprises generating means, a gasometer, a storage-tank for the compressed gas, a gas-compressor interposed between the gasometer and the tank, and suitable gas-distributing pipes and valves. In such a system there are two principal danger-points—one the gas-compressor and the other the point at which a gas-distributing pipe is exposed at a distance from the gas-house—from which notice of danger could not reach the operator at the gas-house in time to enable him to cut off the connection with the storage-tank and prevent the communication of the explosion from the distributing-pipe.

The particular object of this invention is to provide means whereby dissociation, if it occurs in the high-pressure gas-pipes, may be localized and stopped at a point or points remote from the main body or bodies of gas, thus protecting the main body.

Our invention consists, broadly, in a device to be introduced in the pipe which leads from the storage-tank or other source of compressed gas and by which the dissociating explosion-wave that may be generated in a distant part of the system will be impeded and broken up, thus allowing time for fresh gas to enter the device from the supply-tank and stop the progress of the action, whereby the effect of the explosion in the pipes is minimized and disaster to the main body of gas is prevented.

Specifically considered, our invention resides in a preferred form of safety device, which consists in a relatively large and strong coupling arranged between the sections of the high-pressure gas-pipe and filled with material having a large capacity for gas and which blocks the direct passage through the pipe.

Our invention will be more readily understood by reference to the accompanying drawings, forming a part of this specification, and in which—

Figure 1 is a perspective view illustrating the type of acetylene-gas system or plant best adapted for railroad use, with which we are chiefly concerned; and Fig. 2 is a sectional detail of the safety device.

Our invention is applicable to any system pertaining to a gas, such as acetylene, which is subject to dissociation at a relatively low temperature, and the invention is applicable to all municipal, central, or local plants in

which such gas is made and stored. Our experience has been chiefly with plants for supplying passenger-coaches with compressed acetylene gas, same being employed much as Pintsch gas is used. In the illustration we have shown a gas house or plant arranged alongside the railroad-track, upon which cars are brought opposite the yard-valve or filling-pot, from which the service-tanks on the cars are filled.

2 represents the main gasometer of the plant, to which the acetylene gas is supplied through the pipe 3, which leads from the gas-generator and purifying apparatus. (Not shown.)

4 represents the gas-compressor, preferably a steam-actuated pump or compressor, which draws gas from the pipe 5, that is connected with the gasometer 2. Such compressor being well known we have not illustrated same in detail; but 5′ 5′ represent the pipes which lead to the low-pressure or inlet valves of the compressor, while 6′ 6′ represent the pipes which lead from the high-pressure or discharge valves thereof. These pipes are connected with the main high-pressure pipe 6, which, as shown, contains the valves 7, 8, and 9 and extends to the pressure or storage tank 10, which is capable of holding gas at high pressures. In practice the pressure in the tank ranges from five to twenty atmospheres.

11 is the distributing-pipe, which extends from the valve 8 to the distributing-point or, as herein shown, the yard-valve or filling-pot 12.

13 is a flexible pipe extending from the pot 12 and which is used in filling the service-tanks on the cars.

The pipe 11 is preferably buried in the ground and exposed only at the point where it is connected with the yard-valve.

The valves 7 and 9 are simple valves. The valve 7 is intended to be closed when the compressor is not in service, and the valve 9 is only opened when the compressor is in service or when gas is being supplied to the distributing-pipe. The valve 8 is preferably a three-way valve by which the passage may be opened directly between the compressor and the service-tank or between the tank and the distributing-pipe 11. The pumping of gas direct to the service-tanks on the cars is seldom attempted, as it involves too great an expenditure of time.

14 is a relief or return loop or shunt-pipe extending from the distributing-pipe to the suction-pipe 5, that is connected with the gasometer 2. The pipe 14 contains the valve 15, whereby the high-pressure gas that is contained in the distributing-pipe after a car service-tank has been filled may be discharged back into the gasometer. Thus during the greater part of the time the distributing-pipe contains gas at gasometer-pressure, in which condition it cannot be exploded by dissociation induced by a conflagration upon or near an exposed part of the distributing-pipe.

The essential feature of our invention is the impeding or take-up device 16, which we arrange in the high-pressure pipe 6 and preferably, also, at other points in the system—as, for example, in the distributing-pipe near the filling-pot. This device comprises a preferably solid cast-steel cylinder or pipe-coupling, to opposite ends of which the sections of the high-pressure pipe are connected. This contains a large chamber 17, that is filled with porous material, such as broken fire-brick. Screens 18 are preferably arranged at the ends of the pipes to confine the porous material. This safety device is introduced between the distributing-pipe and the storage-tank and between the compressor and the storage-tank. If a spark is struck in the compressor or if any portion of the connected pipes is unduly heated, so as to set up the dissociation of the compressed gas contained in the pipes, the pipes may be disrupted by the explosion; but no serious damage will be done, for the explosion-wave and dissociation will be blocked at the safety-coupling 16. When an explosion occurs, the gas, which is driven back toward the storage-tank and which is undergoing dissociation, is instantly taken up by the porous brick or like substance in the coupling, and is thus prevented from entering the storage-tank. Likewise the explosion-waves are broken up and impeded by the mass of porous material, which mass, as shown, is of much larger cross-section than the gas-pipe. By impeding the flow of vitiated gas and the explosion-waves toward the storage-tank sufficient time is provided for the recovery of pressures, and as the dissociation of the gas in the ramifying-pipes finally decreases the pressure in said pipes fresh gas will rush from the storage-tank to maintain the process of dissociation that is going on in the coupling until said coupling is clogged with carbon and other residue or until the temperature in the coupling is reduced by the entrance of the cool gas from the tank, whereupon danger ceases. The device operates in this manner to protect the system wherever the device is used, and the safety device at the filling-pot operates not only to protect the plant from the effect of an external conflagration, but also fulfils the more important requirement of protecting the service-tank on a car which may be connected with the distributing-pipe at the moment of danger from gas dissociation.

The safety device illustrated is the preferred embodiment of our invention, but it is obvious that the same and the system in general may be modified without departing from the spirit of our invention, and we do not limit or confine the invention to the specific constructions or arrangements herein shown and described.

Having described our invention, we claim as new and desire to secure by Letters Patent—

1. In a gas system for acetylene and the like, the combination of the connected gasometer gas-compressor and gas-tank, with a distributing-pipe, a valve connected with said distributing-pipe for controlling the supply of compressed gas thereto and a loop or shunt-pipe in valved connection with said distributing-pipe, for the return discharge of gas from said distributing-pipe into said gasometer, substantially as described.

2. The acetylene or like gas system comprising the gasometer in combination with the storage-tank, the interposed gas-compressor connected with said gasometer and said tank, the distributing-pipe, valved at its outer and inner ends and a loop or shunt-pipe connected with said distributing-pipe and containing a valve, for discharging the gas in the distributing-pipe into said gasometer, substantially as described.

3. The acetylene or like gas system comprising the gasometer in combination with the storage-tank, the interposed gas-compressor connected with said gasometer and said tank, the distributing-pipe, valved at its outer and inner ends, a loop or shunt-pipe connected with said distributing-pipe and containing a valve, for discharging the gas in the distributing-pipe into said gasometer, and the impeding devices arranged in the gas-pipes in proximity to said storage-tank and the end of said distributing-pipe, substantially as described.

4. In an acetylene or like gas system, the combination of the gasometer with the storage-tank, the interposed compressor connected with said gasometer and said tank, the distributing-pipe, the connection between said distributing-pipe and said gasometer, suitable valves, and the safety devices arranged in the tank connection and the distributing-pipe and each comprising a coupling containing a porous body, as and for the purpose specified.

In testimony whereof I have hereunto set my hand, in the presence of two subscribing witnesses, this 29th day of August, 1902.

MAX TOLTZ.

Witnesses:
C. E. HAWLEY,
J. W. BECKSTROM.

In testimony whereof I have hereunto set my hand, in the presence of two subscribing witnesses, this 25th day of August, 1902.

ARTHUR LIPSCHUTZ.

Witnesses:
C. E. HAWLEY,
J. W. BECKSTROM.