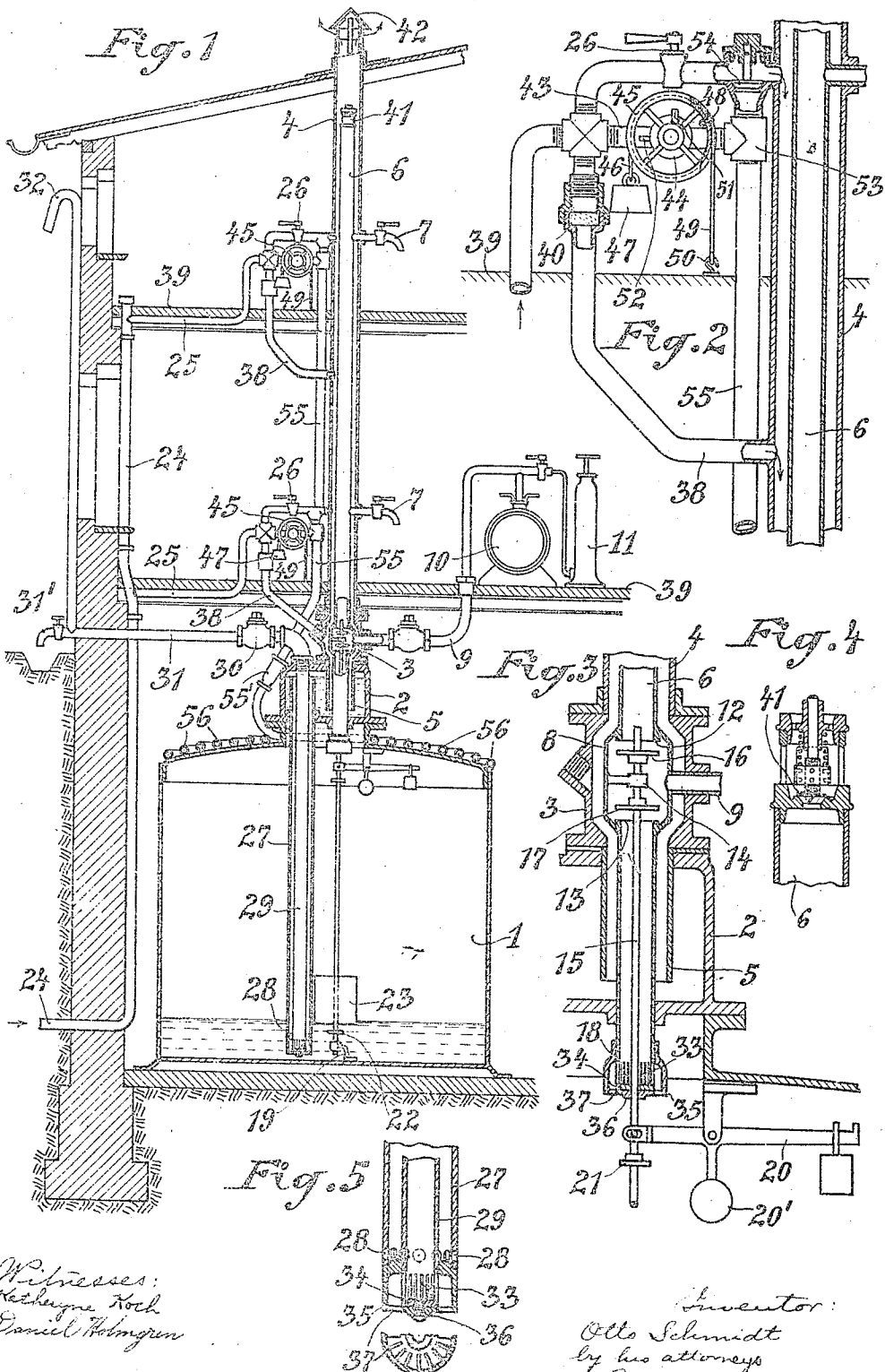


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 APPARATUS FOR INEXPLOSIVELY STORING AND DRAWING OFF IGNIFEROUS LIQUIDS.
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APPARATUS FOR INEXPLOSIVELY STORING AND DRAWING OFF IGNIFEROUS LIQUIDS.

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To all whom it may concern:

Be it known that I, OTTO SCHMIDT, a subject of the King of Prussia, of 4 Kurze-strasse, Haspe, in Westphalia, in the Kingdom of Prussia, Empire of Germany, master coppersmith, have invented certain new and useful Improvements in Apparatus for Inexplosively Storing and Drawing Off Igniferous Liquids; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My present invention relates to an apparatus, or plant, for inexplosively storing and drawing-off igniferous liquids, which is operated by means of water-pressure in such a manner that the bulk of the displaced igniferous liquid, such as benzin, coal-oil or the like, is replaced by the water as usual, and which plant is provided with means executing their several functions automatically as soon as the air surrounding the apparatus reaches a certain degree of temperature, or a fire breaks out in its neighborhood. In the first instance the igniferous liquid in the storage-tank will be cooled through its bodily contact with the water, but in the second instance, in addition to this, the storage-tank will be energetically cooled-off from without by sprinkling-means similar to those employed for stages and other rooms more or less likely to take fire. The possibility of an explosion is further minimized by the fact, that the water employed for displacing the igniferous liquid enters the storage-tank through a stand-pipe which surrounds the discharge-pipe of the igniferous liquid so completely, that the latter is kept cool at all times. Besides this, means are provided, capable of leading-off any volatile gases and vapors which may collect and attain a pressure which, if not duly reduced or relieved, might prove dangerous to the apparatus or the whole plant. In this manner it is made possible to keep the igniferous liquid even in presence of a fire so cool as to prevent its explosion and thus most effectively prevent the loss of life and property.

In the accompanying drawings:—Figure 1 is a vertical sectional view of my invention, Fig. 2 is an elevation of the means employed for usually admitting the water for displacing the igniferous liquid, or cooling the latter and the storage-tank in case

of a fire. Fig. 3 is a similar view of the means for automatically interrupting the admission of the igniferous liquid into the storage-tank and its outflow thereof, when either the smallest volume of water, or the smallest volume of igniferous liquid permissible has been reached in the storage-tank. Fig. 4 is a detail-view of the upper end of the discharge-pipe for the igniferous liquid. Fig. 5 is a similar view of the lower end of the combined water-outlet and discharge-pipe.

Upon the top of the storage-tank 1 an overflow-chamber 2 is arranged, which in turn is surmounted by a casting 3. The latter supports a stand-pipe 4 carried upward through the roof of the building, and a pipe 5 which extends downward and ends within a short distance above the bottom of the overflow-chamber 2. Within said casting 3, stand-pipe 4 and pipe 5 the discharge-column 6 is arranged, which passes upward above the highest tap 7 and downward through the bottom of the overflow-chamber into the storage-tank 1, whereas it is enlarged within the casting 3 to form a double-seated valve-casing 8 to which the feed-pipe 9 is connected. Through the latter the igniferous liquid is forced from the barrel 10 by means of the force-pump 11 in the usual manner. Within the casing 8 the valve-seats 12 and 13 are formed, the former above and the latter below the guide-sleeve 14. In this sleeve a guide-rod 15 is guided which carries the valves 16 and 17 arranged in such a manner, that when the one is seated the other is opened, and vice versa; or both valves are open at the same time, as shown in the drawing. The guide-rod 15 also passes through the flame-extinguisher 18 arranged at the lower end of the discharge-column 6 and is further guided in a bracket 19 secured to the bottom of the storage-tank 1. To keep the valves 16 and 17 in their normal position, said valve-rod is balanced by means of the weighted lever 20 always duly returned to its normal position by the aid of its weighted arm 20' acting as a pendulum. The valve-rod 15 is further provided with tap-pets 21 and 22 between which a float or swimmer 23 of such specific gravity is arranged, that it will not be carried upward by the igniferous liquid, but will always remain in contact with the body of water which carries and discharges said liquid

when one or the other of the taps 7 arranged in the several stories of the building is being opened. The float 23 will operate the guide-rod 15 to close the valve 16 when the igniferous liquid in the storage-tank has been reduced to the smallest volume permissible, which closure will take place, when the float 23 strikes the tappet 21, whereas the valve 17 will be closed, when the float rests upon the tappet 22, or in other words, when the body of the water contained in the tank has attained its smallest depth permissible.

The water employed for forcing the igniferous liquid out of the storage-tank enters the latter by way of the water-pipe 24, any one of the branch-pipes 25 and cocks 26, stand-pipe 4, overflow-chamber 2 and the outlet-pipe 27, from which it is discharged through the series of openings 28 into the tank 1, so that it can act from below upon the specific lighter igniferous liquid. When the latter has been discharged to such an extent that the taps 7 do not any more discharge any igniferous liquid on being opened the tank has to be refilled. The water forced out thereby passes through the discharge-pipe 29 which passes upward through the outlet-pipe 27 and the chamber 2 and discharges the water through the check-valve 30 and pipe 31 and its goose-neck 32, whereas the cock 31' only serves for draining purposes. The goose-neck is of course arranged at a height to let the water-column thus formed act as a counter-balance to the liquid-column contained in the column 6.

In order to prevent any possibility of a flame, formed by any causes whatever, finding its way into or out of the lower end of the discharge-column 6 and the discharge-pipe 29 respectively, each of these pipes is at its lower end provided with a flame-extinguisher 18 formed by providing the end of the pipe with a series of very narrow slots 33 and a solid bottom 34, surrounded by a wide bell-shaped hood 35, which encircles a false-bottom 36 provided with a series of radial slots 37. The latter are likewise very narrow and as they run at right angles to the slots 33 a device is provided which under no conditions whatever will permit the passage of a flame the one way or the other, since in case a flame should succeed to pass the one series of slots, it would be sufficiently cooled off to be extinguished before it could possibly reach the other series of slots and all the more so, because compelled to change its direction too. Hence the explosion of the liquid through the instrumentality of a flame is fully excluded.

Supposing, that in either of the stories of the building a fire has broken out in the absence of the workmen. The heat gener-

ated thereby would of course increase and gradually impart itself to the stand-pipe 4 to such an extent as to become dangerous to the discharge-column 6 which contains a part of the igniferous liquid. To avoid this possibility at all events, a by-pass-pipe 38 is provided, which passes through a floor 39 separating either two stories, or a story and the basement, of the building. In this branch-pipe a safety-plug 40 of such a composition is arranged, that it will melt when a certain temperature has been reached, which of course lies below a point of temperature at which the contents of the discharge-column 6 are endangered, even when per chance the water-mantle usually surrounding said column should have been partly evaporated, or disappeared by leakage or other causes. The melting of the plug 40 permits the water to flow unchecked into the stand-pipe and through the overflow-chamber 2 to pass through the outlet-pipe 27 into the storage-tank 1, from which it expels an equal volume of the older and therefore higher tempered water through the discharge-pipe 29, check-valve 30 and pipe 31, because the resistance offered in this direction is considerably less and consequently is overcome with a smaller expenditure of pressure than required to force the igniferous liquid out of the discharge-column 6 against the spring-closed safety-valve 41, closing said discharge-column and capable of being adjusted to suit any desirable pressure. In this manner the contents of the storage-tank can be kept cool enough to exclude any danger of explosion. Any vapors collecting thereby within the tank can freely ascend the discharge-column 6 and, if sufficiently compressed, open themselves the safety-valve 41 and escape through the stand-pipe 4 capped by the conical-hood 42. The latter is arranged above the roof at such a height, that in case the escaping gases or vapors should be ignited they would burn like a torch and yet not endanger the roof, because lying without the zone of danger. In case the fire should rage in close proximity to the stand-pipe 4 and discharge-column 6, so that in consequence thereof a more energetical cooling of said discharge-column 6 ought to take place, the following device is automatically operated, apart from by-pass-pipe 38. This device consists of a branch-pipe 43 which contains a cock 44, carrying a grooved hand-wheel 45. In the groove of the latter a wire or chain 46 is arranged which carries at its free end a weight 47 and is fastened with the other end to the rim of the wheel by means of a clamp 48 or the like, which simultaneously retains the upper end of a thread or rope 49 secured with its lower end to the floor 39 by the aid of the hook 50 or the like. The thread or rope is made of a material which is easily

ignited and burned. At the moment this takes place the weight 47 is free to act, whereby it will open the cock 44 by giving the wheel-rim a quarter of a turn, or in other words, by turning the wheel until its thumb 51 strikes against the stationary shoulder 52. The water rushes now through the branch-pipe 43 into the T-coupling 53 to pass partly upward through the check-valve 54 into the stand-pipe 4 and partly downward through the pipe 55 to the perforated coiled pipe or sprinkler 56 arranged on top of the storage-tank 1. That part of the water which passes through the valve 54 into the stand-pipe 4 flows along with the water from the by-pass-pipe 38 to the tank to cool the contents thereof, whereas the part of the water which flows through the pipe 55 flows into the sprinkler 56, from which it runs in small streamlets all over the top and sides of the tank 1 to keep the latter and in consequence thereof its contents cool. To make the automatically operating water-suppliers arranged upon each floor act independently of each other, their pipes 55 are led to a head 55' common to both, with which the sprinkler 56 is connected. It will thus be seen that the plant protects itself automatically against the dangers entailed by a fire, since it not only compels the water to form a cooling water-mantle around the discharge-column of the liquid and around the shell of the storage-tank, but also brings it into bodily contact with the liquid itself notwithstanding the fact, that the cock 44, usually admitting the water for displacing the liquid, is closed. By means of this invention it is thus made possible to obtain the greatest protection against the destructive consequences of an explosion of the igniferous liquid, since the latter will always be kept below the dangerous temperature so long as the automatically operating water-suppliers are not destroyed.

I claim:—

1. An apparatus of the class described, comprising a storage-tank, a communicating igniferous liquid discharge column having a pair of lower valve seats, a water pipe also communicating with the tank and surrounding the discharge column, an inlet pipe entering the column between the valve seats, a pair of valves adapted to cooperate within said seats, a rod carrying said valves, and a weighted balancing lever connected to the rod.

2. An apparatus of the class described, comprising a storage-tank, a communicating igniferous liquid discharge column, a water pipe also communicating with the tank and surrounding the discharge column, an inlet pipe communicating directly with the water pipe, a by-pass forming an addi-

tional connection between the inlet pipe and the water pipe, and a fusible plug within the by-pass.

3. An apparatus of the class described, comprising a storage-tank, a communicating igniferous liquid discharge column, a water pipe also communicating with the tank and surrounding the discharge column, an inlet pipe communicating directly with the water pipe, a branch pipe forming an additional connection between the inlet pipe and the water pipe, a cock controlling the branch pipe, a wheel carried by the cock, a thumb on the wheel, a cooperating fixed stop, a fusible string for securing the wheel in position, and a weight suspended from the wheel.

4. In an apparatus of the class described, a storage tank adapted to contain igniferous liquid, a liquid discharge column extending upwardly from said tank, a stand pipe surrounding said discharge column, a water-supplier consisting of a supply-pipe combining a water-source with said stand-pipe, a cock for admitting water to said stand-pipe or shutting it off therefrom, a by-pass-pipe connecting said supply-pipe with said stand-pipe, a plug in said by-pass-pipe to admit water to said stand-pipe independently of said cock when melting at a certain temperature, a sprinkler, a branch-pipe connected with said sprinkler and with said supply-pipe at points lying at different sides of its cock, a check-valve arranged at the junction of said supply-pipe with said branch-pipe lying between said cock and said stand-pipe, and an automatically operated cock in said branch-pipe to admit simultaneously water to said sprinkler and to said stand-pipe independently of the closed cock of said supply-pipe.

5. In an apparatus of the class described the combination of a stand-pipe, a storage-tank, a sprinkler arranged on top of the latter, a water-supply-pipe connected with said stand-pipe, a by-pass-pipe connecting said supply-pipe with said stand-pipe, means in said by-pass-pipe for opening the passage of the water when a certain temperature is obtained in close proximity to said stand-pipe; a pipe-connection between said supply-pipe, said stand-pipe and said sprinkler; a mechanically operated cock arranged in said pipe connection for admitting simultaneously water to said sprinkler and through said stand-pipe to said tank, means steadily tending to open said cock, and means preventing the opening of said cock until destroyed by the action of fire.

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