W. J. MOELLER.

GAS TANK ABSORBENT FILLER.

APPLICATION FILED JULY 21, 1911.

1,011,988.

Patented Dec. 19, 1911

2 SHEETS—SHEET 1.

Fig. 3

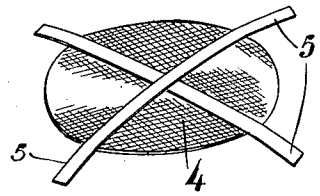

Fig. 1

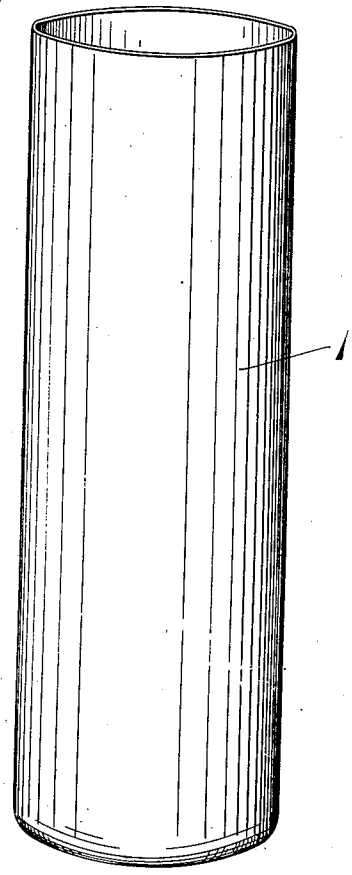

Fig. 2

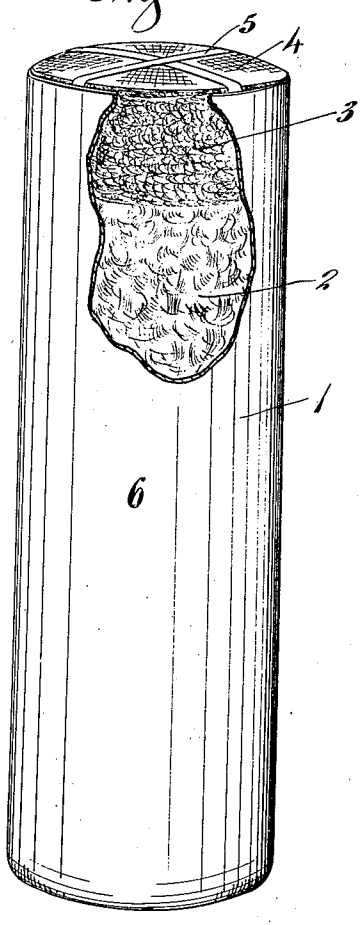

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Fig. 4

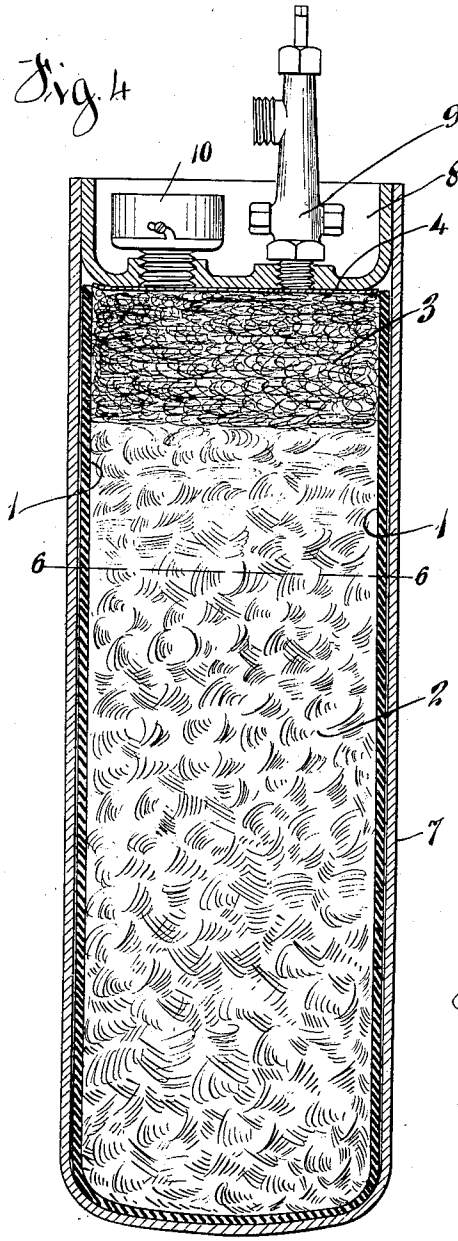


Fig. 5

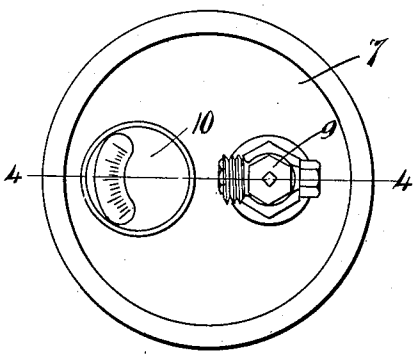


Fig. 6

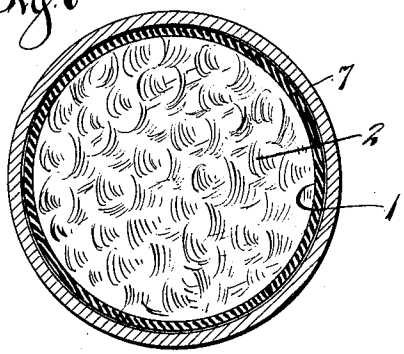
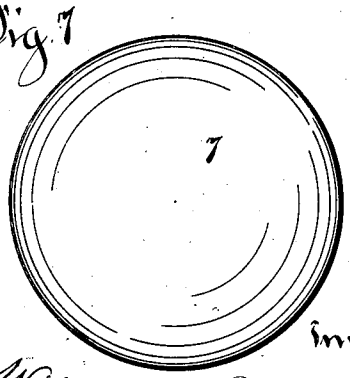


Fig. 7



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UNITED STATES PATENT OFFICE.

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GAS-TANK ABSORBENT FILLER.

1,011,988. Specification of Letters Patent. Patented Dec. 19, 1911.

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To all whom it may concern:

Be it known that I, WILLIAM J. MOELLER, a citizen of the United States, residing at Wyoming, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Gas-Tank Absorbent Fillers, of which the following is a specification.

My invention relates to improvements in gas tank absorbent fillers.

The object of my invention is to provide a safe, economical, convenient, efficient and durable absorbent filler for use in gas tanks, such as are used to furnish light for automobiles, and for various other purposes.

My invention consists in a compressed asbestos tubular shell containing a mixture of asbestos and cotton fibers, and provided at its open end with a layer or thickness of asbestos fiber only, and having the end covered with asbestos cloth suitably secured in position thereon.

My invention also consists in the several features herein set forth as particularly pointed out in the claims.

In the drawings which serve to illustrate the construction and use of my invention: Figure 1 is a perspective view of my compressed asbestos tubular shell ready for filling. Fig. 2 is a perspective view of the tubular shell ready to be placed in the gas tank. Fig 3 is a view of the asbestos cloth disk for covering the end of the tubular shell. Fig. 4 is a longitudinal sectional view of the gas tank and the tubular shell placed therein, taken on the line 4—4 of Fig. 5. Fig. 5 is a view of one end of the tank. Fig. 6 is a cross section on the line 6—6 of Fig. 4. Fig. 7 is a view of one end of the tank.

In the embodiment of my invention as illustrated and which shows a preferred construction, 1 represents a tubular compressed asbestos shell, which is formed in any suitable and convenient manner, preferably without overlapping seams or edges. I construct this shell by taking a sheet of wet asbestos material, cutting it to the required shape to form a tubular shell, place it upon a form and then compress same until its meeting edges are joined and firmly united together to form a seamless tubular shell without uneven or overlapping raised parts, thus obtaining a perfectly true and smooth interior and exterior surface. I thoroughly mix a quantity of fibrous asbestos and cotton, and fill said tube therewith to within a short distance of its open end, say for instance about two and one-half to three inches therefrom, packing said mixture 2 within said shell or casing. I then fill the remainder of said casing with asbestos fiber 3, packing it in the same manner. Over the open end of said casing I secure a disk of asbestos cloth 4 by means of strips or tapes 5, pasted to said disk and to the tube respectively. The asbestos fiber and cotton fiber, as well as the tubular shell, form a porous body for the purposes hereinafter set forth. When the filler 6 is thus formed, it is ready to be placed within a metal tank 7 of similar shape, and sealed therein by having one end 8 of the tank brazed therein. The air within the tank is then exhausted through the outlet 9 by means of a suitable air pump and the vacuum space thus created is filled with liquid acetone or acetaldehyde, or other liquids which have the property of absorbing acetylene gas, when the tank is thus filled as much acetylene gas as will be absorbed in the mixture and in said liquid, will be introduced into the tank ready for use in producing a light.

When the gas tank is thus provided with my improved filler and charged with the liquid, it is ready for continuous use, and all that is necessary thereafter is to charge it with acetylene gas through the outlet or valve 9 as it is used up; the mixture and the liquid remaining permanently therein as the absorbent agents for the acetylene gas. A suitable gage 10 is provided to register the pressure within the tank. In order to obtain a proper understanding of the advantages and merits of my invention, it should be stated that acetylene gas if stored under a pressure of over fifteen pounds per square inch, is liable to explode from a jar or spark or any other slight cause. In storing it for use for lighting purposes, it has to be stored under a pressure of from two hundred and fifty to three hundred pounds per square inch in order to get enough gas in a sufficiently small tank to make it commercially useful. There are a series, or family, of liquids among which are acetone, acetaldehyde and others which have the property of absorbing acetylene gas. When

the gas is so absorbed, it can be stored safely up to a pressure of three hundred pounds per square inch. When these liquids absorb the acetylene gas they expand. Consequently if a tank were filled with such a quantity of this liquid so that when fully charged to say three hundred pounds pressure per square inch the tank were completely full, and then a quantity of acetylene gas should be drawn off, a cavity would be left in the tank due to the contraction of the liquid which would leave a pocket of gas under a fairly high pressure. This would then be in danger of explosion from a very slight cause. Consequently in storing acetylene gas by absorbing it in a liquid, a spongy arrangement has to be provided to take care of the expansion and contraction of the liquid. By this arrangement, when the liquid contracts, only small pockets of gas are formed throughout the sponge, and these pockets are too small to cause any danger of explosion. When acetylene gas thus absorbed in liquid is thus stored, there is absolutely no danger of explosion up to three hundred pounds per square inch.

If pure asbestos fiber is used as a filler, when the absorbing liquid enters the filler, the asbestos fiber has a tendency to pack if the tank is subjected to a jarring motion.

If the filler is made in a form that is spongy, that is, one which will expand when it absorbs liquid, the irregularities or depressions are usually allowed to the extent of one-eighth of an inch, as it is estimated that when such fillers absorb liquids they will expand and completely fill up the storage tank. However, if a filler has a hard shell which will not allow for expansion, the maximum distance from the outside of the filler to the inside wall of the tank is usually limited to one-sixteenth of an inch, as it is estimated that a gas pocket of this size will not be dangerous. The hard wall of the filler is simply a means for handling the same.

The compressed asbestos tubular shell as made by me has several advantages over the molded types of fillers. As the shell is made on a form which is turned absolutely true to start with, the shell itself is always absolutely circular in cross section. The surface of the shell is likewise extremely smooth with no pockets or indentations. A straight edge laid along the outside surface of the tubular shell shows that a variation from a straight line is very small indeed, probably not greater than a thirty-second of an inch in any case. The shell itself is stiff enough to make it easy to handle the entire filler when it is ready to be placed in the tank, and is likewise flexible enough to conform to the shape of the tank in case it is not a true circle. There are no external laps or irregularities caused by folding one sheet of asbestos paper over another. It can be made to fit absolutely true to any curvature that there may be in the storage tank. A filler made up of such a shell packed with a mixture of asbestos and cotton fiber has a much greater porosity than the molded type of filler.

Up to the present time the method of making a molded filler was as follows: A perforated metal mold was made slightly larger in internal dimensions than the external dimensions of the finished filler. Cotton and asbestos fibers were then packed tightly into this perforated mold, which was then dipped for a given length of time into a binding solution. These molds were allowed to dry under various temperatures until all moisture was driven off and then the molds were opened and the molded filler taken out. In this process of drying, the fillers were liable to shrink and warp, causing irregularities in the surface. The binding material likewise penetrated to various depths due to the manner in which the fibrous materials were packed in the mold and also due to the length of time which the mold was dipped in the binding solution. This caused various thicknesses of this outer crust or wall, which in turn caused variations in the porosity. The fillers made in this manner were very seldom uniform. This is the big advantage which my compressed asbestos shell packed with cotton and asbestos fiber has over the old type of molded fillers. By my construction I get a shell into which fibrous material is packed in order that the whole may be readily and conveniently handled, after it is assembled as shown in Fig. 2 ready for shipment or storage. It can be readily inserted into the metal tank and sealed therein as shown in Fig. 4. Thus it will be seen that I derive the important advantage of having all of the fibrous material housed and protected within the shell which is an article of manufacture complete in itself ready whenever required for use in the metal tank. Another advantage which it possesses is that it may be so formed complete in itself ready to closely, accurately and properly fit the tank in which it is to be placed. This shell is composed of asbestos fiber mixed with water, and which is passed through rolls and compressed. The materials entering into the construction of this compressed asbestos shell are neither basic nor alkaline in action.

The tubular shell is taken in its wet state and formed or compressed to the desired form after which it is dried.

In order to protect the outlet 9 and keep the asbestos fiber 3 from getting into the valve therein and clogging it, the asbestos cloth disk 4 is placed across the end to act as a sieve. My invention provides for the storing of a greater quantity of gas in a tank

of a given size than otherwise, and it produces better gas than otherwise. It also does away with the binder and provides a new method of being able to handle the fiber. The molded fillers will shrink and warp and are not adapted to fit the tank properly, whereas my device being formed true and smooth, produces a snug fit. The compressed asbestos tubular shell as made by me can be made to fit the dimensions of the tank much more accurately than the molded types of fillers, due to the fact that expansion or contraction can be more easily taken care of and that the shell remains on the form snugly until it is dried, finished and ready to be packed with fibrous material or mixture. As before stated, it is smooth and straight, having no depressions or bends in it. Being a true circle, it will fill exactly the tank to a very small fraction of an inch. The rounded end conforms exactly to the rounded curvature of the tank. The thickness of the wall allows more space for asbestos and cotton fiber, thus increasing the porosity and consequently the capacity of the device. The liquid into which the gas is absorbed acts as a safeguard and has an extra storage capacity, as it will absorb three or four times its own volume. The mixture of asbestos fiber and cotton fiber may be pressed or packed in the tubular shell as heretofore described, or said shell may be lined with a binder to hold the fibrous material to the walls of the shell and prevent said fibers from moving longitudinally therein, and also preventing the fibers from settling away from the walls, or as stated, of packing in the direction of the length of the wall. Briefly the filler constructed in accordance with my invention is more true, every piece being the same. It is more porous due to the thinness of the wall. It is lighter in weight due to the fact that the compressed asbestos pulp of which the shell is made lighter than the binding material used in the molded types of fillers.

I claim:

1. An article of manufacture comprising an asbestos shell having porous material placed therein, the whole to be used as an absorbent filler within and for acetylene gas tanks.

2. A gas tank absorbent filler, comprising an asbestos shell, a fibrous or spongy mixture within said shell adapted to receive asbestos, liquid and gas, substantially as set forth.

3. A gas tank absorbent filler comprising a tubular compressed asbestos shell, a fibrous mixture in said shell, and an asbestos cloth disk adapted to cover the end of said shell, substantially as set forth.

4. A gas tank asbestos filler comprising a compressed asbestos tubular shell and absorbent material contained within said shell.

5. A gas tank absorbent filler comprising a compressed asbestos tubular shell having a curved closed end, cotton fiber and asbestos fiber mixed and commingled together in substantially equal proportions and filling said shell the greater portion of its length, asbestos fibers filling the shell the remainder of its length, and a sieve like covering for the open end of said shell, substantially as set forth.

6. In a gas tank absorbent filler, a compressed asbestos shell, an asbestos filler contained entirely within said compressed asbestos shell, and means for retaining said filler therein.

7. In a device of the character described, a gas tank, a compressed asbestos shell therein, an absorbent mixture in said asbestos shell, means for retaining said mixture within said asbestos shell, said shell being adapted to closely fit within said tank, and an end adapted to be brazed in said tank to close the same, substantially as set forth.

8. The herein described process which consists, first in forming a compressed asbestos shell, then placing a mixture of asbestos and cotton fiber therein the greater portion of its length, then placing a mixture of asbestos fiber therein the remainder of its length, then placing an asbestos cloth sieve upon the end of said tube to cover the same and retain the fibers therein, then placing said filler thus formed within a metal tank and closing the same by brazing the end therein, then exhausting the air from said tank forming a vacuum therein, then filling said vacuum with absorbent liquid and then filling said absorbent liquid with acetylene gas, substantially as set forth and for the purposes specified.

WILLIAM J. MOELLER.

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