June 28, 1932. H. C. A. MEYER 1,864,924

WATERLESS GAS HOLDER

Filed Nov. 6, 1930 4 Sheets-Sheet 1

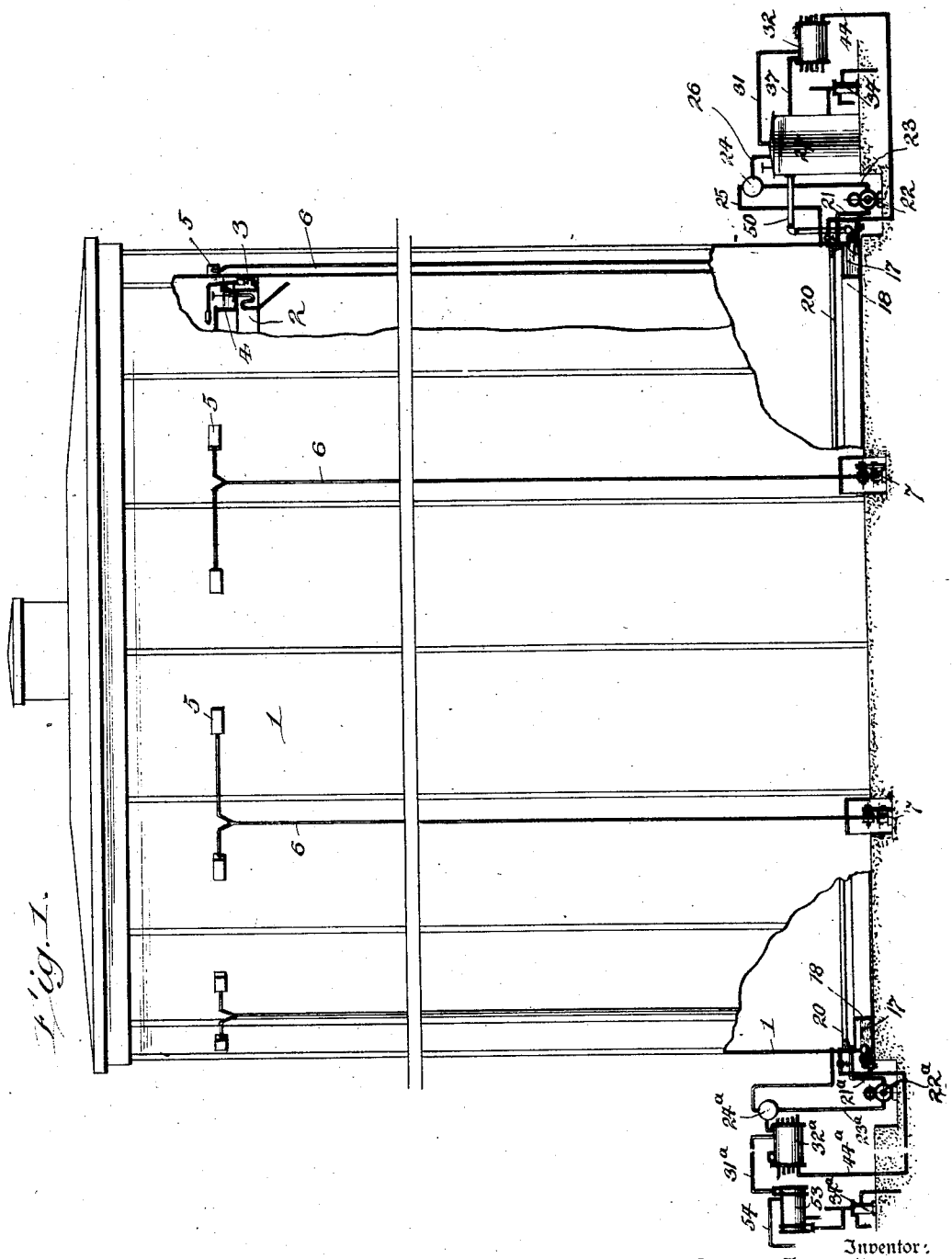

Fig. 1.

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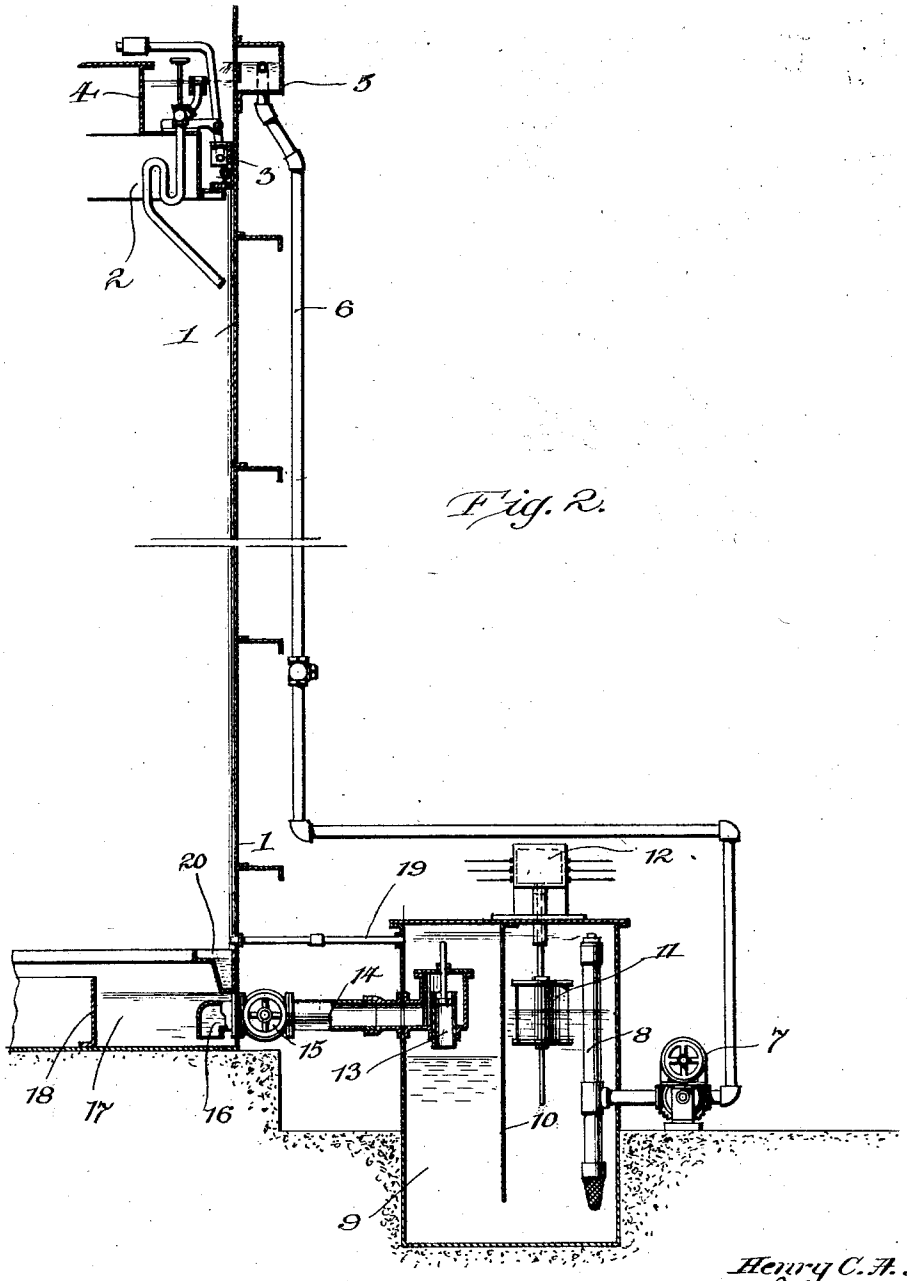

Fig. 2.

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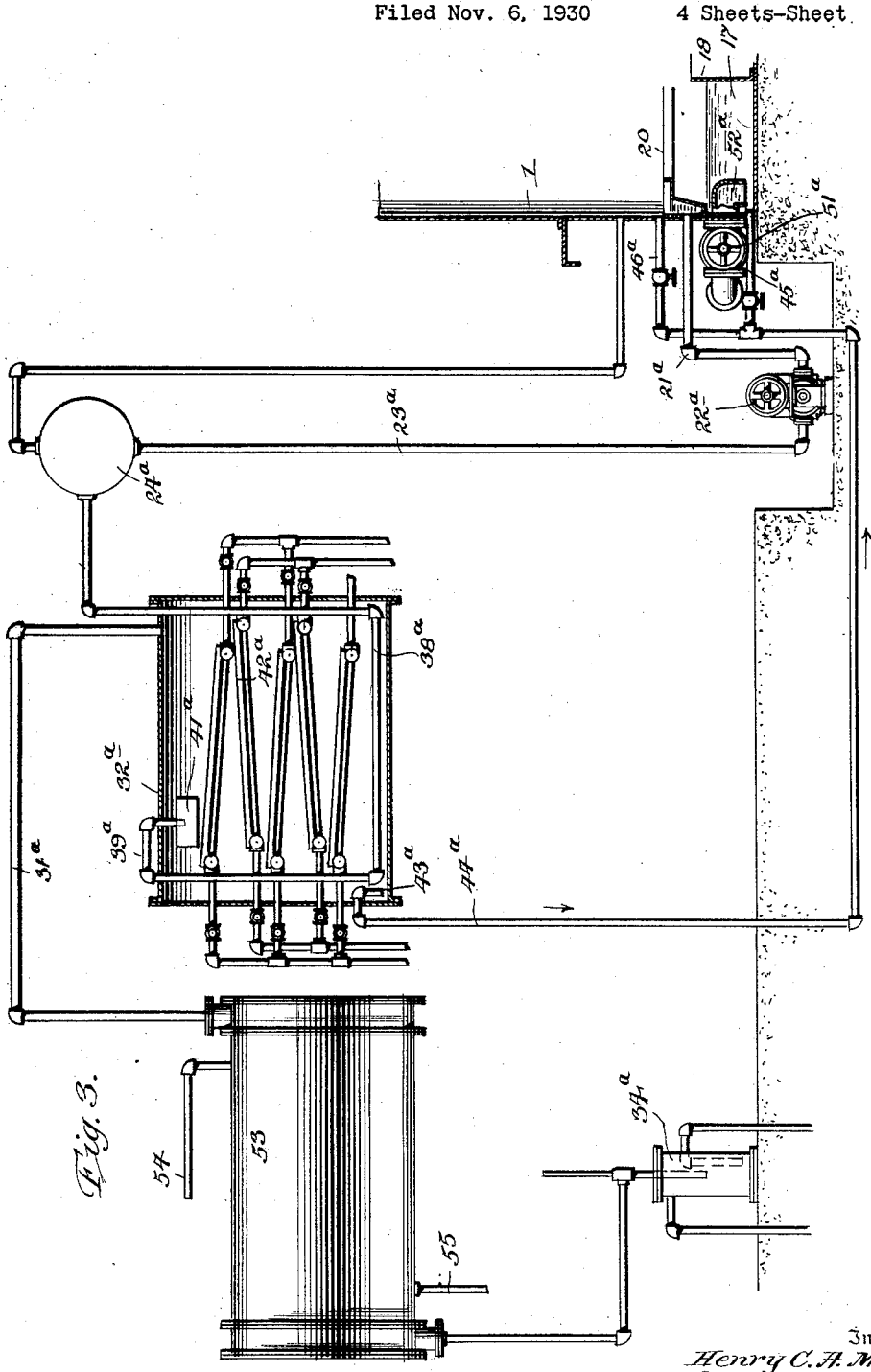

Fig. 3.

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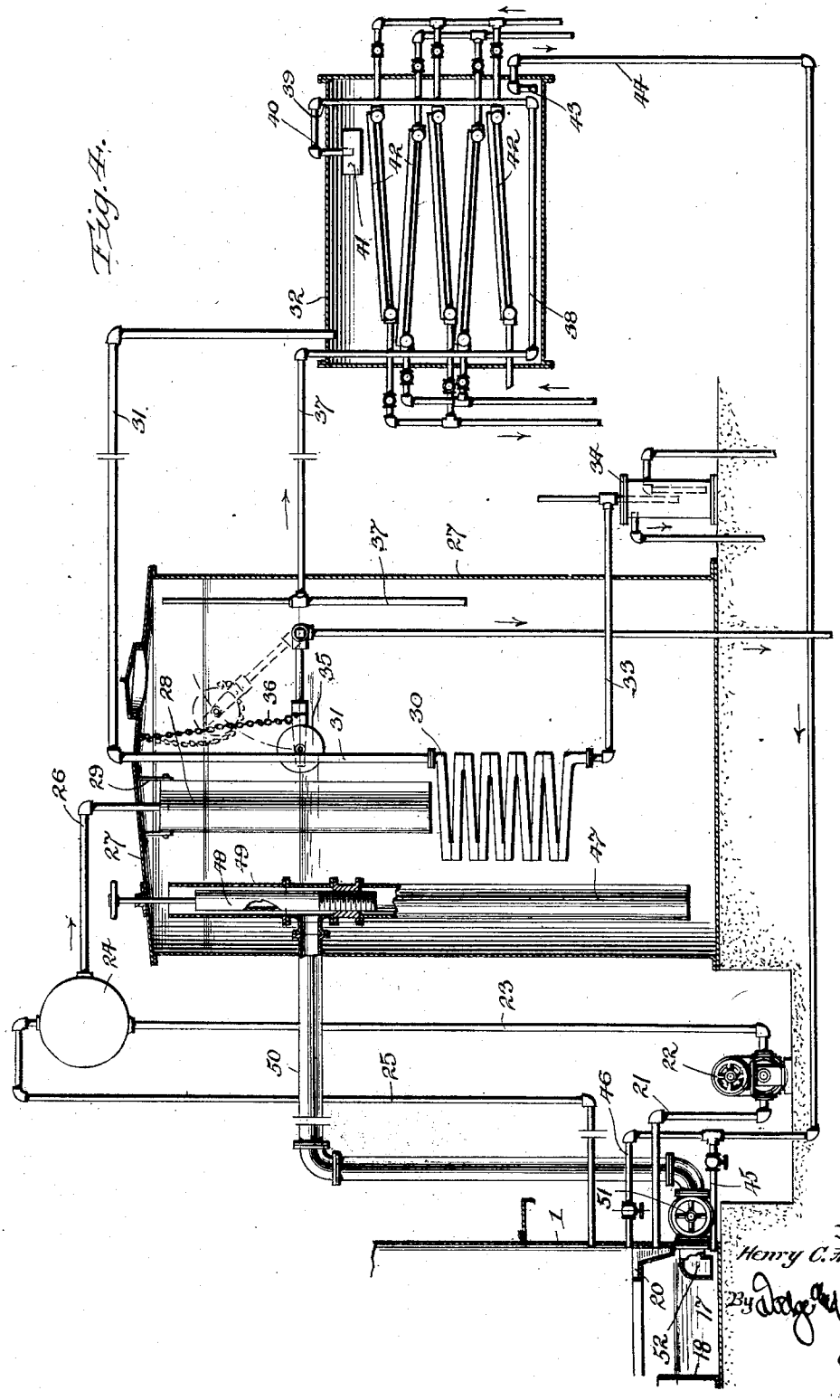
Fig. 4.



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UNITED STATES PATENT OFFICE

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WATERLESS GAS HOLDER

Application filed November 6, 1930. Serial No. 493,866.

This invention pertains to gas holders and more particularly to holders of the so-called waterless type, a typical example of which is illustrated in Letters Patent to Jagschitz Numbers 1,275,696, dated August 13, 1918, and 1,545,960, dated July 14, 1925.

In the first of said patents an annular channel *g* is provided and in the latter a similar channel 14 is present, said channel in each instance serving to collect the sealing liquid, usually tar, glycerine, heavy oil or other mobile medium, which passes down the inner surface of the shell of the holder from the sealing means utilized in conjunction with the piston-like closure employed in holders of the type hereinbefore referred to.

During cold weather, and particularly at night, water passing from the gas or tar will form frost upon the inner surface of the shell and when the temperature rises the frost which is formed is freed and falls off, dropping down into the collecting channel, which is of relatively large capacity, and causing not only a splashing of the sealing liquid outwardly of the channel but likewise causing a dilution of the tar or other sealing material. Also at any time other than freezing weather when the temperature of the gas entering the holder is hotter than the temperature of the shell, water and light oil will condense out on the shell and flow into the collecting channel, causing a dilution of the tar. Such tar, prior to its being pumped back to the sealing portion of the holder, must be treated so as to remove the water and light oils therefrom.

The main object of the present invention is to provide means within the holder, and above the usual tar channel or dam, for arresting falling frost, water, and light oils, as well as the down-flowing tar, and preventing the same from passing directly into the lower channel and contaminating the tar therein. Said means preferably takes the form of a supplemental dam from which the admixture of moisture, light oil condensate, and tar are withdrawn and treated. In this way the matters which may be looked upon as foreign to the sealing tar, as well as the down-flowing tar, are arrested by the supplemental dam and pass immediately to a conditioning apparatus, which may involve heating means, where such admixture is treated. The reconditioned, or good tar is returned from the conditioner to the main channel, or to the supplemental dam as the case may be. By this arrangement a very much smaller quantity of liquid is handled in the conditioning apparatus, thus decreasing the work which is to be performed by the conditioner and consequently reducing the cost of conditioning the sealing fluid by saving in steam. There may also be employed a skimmer tank to which the tar from the supplemental dam is delivered and in which tank cooling coils are employed, which coils are cooled by the incoming tar. The vapor from the conditioner passes through these coils and is condensed on its way to a decanter where the water and light oils are separated.

In the annexed drawings I have disclosed a waterless holder of the general type set forth in the patent first above mentioned, together with the associated elements or mechanisms employed to withdraw, condition, and return the conditioned tar to the holder.

One form of apparatus for effecting the purposes of my invention is shown in the annexed drawings wherein,

Figure 1 is a side elevation of a holder with parts broken away to more clearly illustrate the structure;

Figure 2, an enlarged detail sectional vertical view of a portion of the holder and illustrating the position of the supplementary dam with reference to the usual tar dam and also the tar seal tank;

Figure 3, a sectional elevation showing means for withdrawing and conditioning the material collected in the supplemental dam together with means for returning the conditioned tar to the holder and a condenser for treating the vapors driven off by the conditioner; and

Figure 4, a sectional elevation showing the conditioner for the substances withdrawn from the supplemental dam together with means for heating the tar prior to its return to the holder.

In the drawings 1 denotes the shell of the

holder; 2 the piston-like closure; 3 the usual rubbing bars or sealing elements; and 4 a channel extending around the upper portion of the piston and designed to maintain a body of sealing liquid, such as tar, therein, said liquid cooperating with the bars to form a gas seal.

Tar is fed to the channel 4 at various points around the upper portion of the holder through distributor boxes 5 connected with pipes 6 extending downwardly and terminating in the outlet side of a pump 7. Said pump withdraws tar through the lower end of a pipe 8 located in a tar seal tank, denoted generally by 9, and divided by a partition 10 which extends downwardly from the top to a point near the bottom. Mounted within that portion of the tank in which the pipe 8 is located is a float 11 controlling a switch 12, the leads whereof pass to the pump 7, or a plurality of such pumps as the case may be. In the opposite side of the tank there is located an adjustable weir 13 connected to a pipe 14, the inner end whereof is provided with a valve 15 outward of the shell 1. The opposite end of the valve is connected to an inverted up-take pipe 16 which extends downwardly toward the bottom of the main tar dam denoted generally by 17 and formed by an upstanding wall 18 and the wall 1 of the holder.

The construction thus far described is substantially that shown in the patent to Jagschitz Number 1,545,960, above mentioned.

Connecting the upper portion of the tar seal tank with the gas space of the holder is a pipe 19, Fig. 2. Located within the holder at a point slightly above the tar dam 17 is a supplemental dam 20, secured to the inner wall of the holder shell 1. Any substance passing down the inner surface of the wall 1 will pass into this supplemental dam rather than into the lower tar dam 17. Thus said supplemental dam will collect the tar, oil, water of condensation and frost and will prevent contamination of the tar within the lower dam 17, from which latter the tar is withdrawn and pumped up to the sealing means above described.

Connected into the lower portion of the supplemental dam 20 is a pipe 21 which in turn is connected to a pump 22, the output side of which is connected by a pipe 23 to a gas trap 24 from the upper portion of which latter a pipe 25 leads to the lower portion of the gas section of the gas holder. Any tar or mixture of water, tar and oil will pass from the trap 24 through a pipe 26 extending into the upper end of a tank 27 and terminating within a distributor shell or casing 28 supported at its upper end by brackets 29 extending downwardly from the top or cover of the tank. The lower end of this member 28 stands above a series of hollow coils and leads the cold incoming tar down from pipe 26 into the skimmer tank and over the interconnected hollow coils or plates and being cool tends to impart a low temperature to the coils designated by 30.

A pipe 31 is connected into the upper end of the coils 30 and extends into the upper end of a conditioner tank 32. Any vapors arising in said tank pass through said pipe to the coils 30 and thence, after being condensed, through a pipe 33 to a decanter 34 in which the oil and water are separated.

The materials passing from the supplemental dam 20 into the tank 27 will substantially fill such tank and any light oils and/or water floating upon the surface of the tar, which is heavier and which stays in the lower portion of the tank, may be drawn off through a float controlled valve denoted generally by 35. A chain 36 attached to the upper portion of the tank 27 and to the float valve prevents the float from passing down into the tar and discharging it from the tank. Tar will pass from the tank 27 upwardly through the lower end of a pipe 37, which pipe extends through the wall of the tank and into the conditioner tank 32. In this it passes downwardly to the bottom of the tank where it is connected with a pipe coil or preheating coil 38 which lies close to the bottom of the tank in the hot conditioned tar and from the opposite end of which there is provided an upwardly extending pipe 39 terminating in a downwardly extending element or nozzle 40 which discharges into a distributor box 41.

Mounted within the shell or tank 32 is a series of trays which are steam heated by pipes which are denoted generally by 42. These pipes are connected to intake and outlet mains (not shown) so as to insure proper circulation of steam through the pipes. Any light oil and/or water is thus vaporized from the tar, water, and oil passing over the trays and passes off through the vapor main 31 heretofore described.

The tar which is in a heated condition by reason of its passing over the heated trays and through the preheating element 38 passes upwardly through a downturned nozzle or pipe 43 connected to a main or pipe 44 which extends toward the gas holder where it is provided with two valved branches 45 and 46, the former discharging into the main tar dam 17 and the latter into the supplemental dam 20.

Located within the tank 27 is an uptake pipe 47 provided with an adjustable weir or gate 48. By lowering or raising this weir or gate which is spaced from an upward extension 49 of the pipe 47 the flow of tar upwardly from the lower portion of the skimmer tank through the pipe 47 and to a branch main 50 connected into the pipe 47 may be controlled. The main 50 is connected with the main tar dam through a valve 51 and a downturned pipe 52.

In Figure 3 there is shown a conditioner 32ª similar in construction and operation to the conditioner shown in Figure 4. Similar parts are similarly lettered with the exponent "a". As with the other form the heated tar may be delivered through the pipe 44ª to the main tar dam or the supplemental tar dam through pipes 45ª and 46ª respectively. In this instance instead of passing the vapors through cooling coils mounted in a skimmer tank an ordinary form of condenser denoted by 53 is employed, the cooling liquid passing inwardly through a pipe 54 and outwardly through a pipe 55. The condensed vapors pass to a decanter 34ª where the oil and water are separated.

The arresting of the down-flowing substances upon the inner surface of the gas holder, such as tar contaminated with oils or water and likewise frost which may form upon the inner surface of the holder during cold weather, by the supplemental dam prevents contamination to a very large extent of the tar in the main dam 17 from which latter the tar is withdrawn and pumped upwardly to the distributor boxes 5. Good practice necessitates that the lower tar dam 17 should be of considerable extent, or in other words have a relatively large cubical capacity in order that there may be sufficient tar present at all times in the system to effect the proper charging of the channel 4. On the other hand by the utilization of the supplementary dam 20 the tar within the lower main dam remains substantially undisturbed insofar as any substance passing down along the inner wall of the holder is concerned. This supplementary dam being of relatively small area enables one to withdraw the materials therefrom and quickly treat them with a view of separating and purifying the tar and returning said purified tar, preferably in a warm condition, to the lower or main dam from which it is pumped upwardly through the tar seal tank to the distributor boxes 5.

What is claimed is:

1. In a waterless gas holder, the combination of a shell, a piston-like closure, and sealing means carried by the closure and cooperating with the shell; a dam within the lower portion of the shell adapted to hold a sealing material; a second dam located above the first dam; means for withdrawing the sealing material and any contaminating substances from said second dam; means for segregating the sealing material from contaminating substances; and means for returning the sealing material to the holder.

2. In a waterless gas holder, the combination of a shell, a piston-like closure, and sealing means carried by the closure and cooperating with the shell; a dam for sealing material located at the base of the holder and extending entirely around the inner surface of the wall of the holder; means located above said dam for intercepting the flow of sealing material and contaminating substances into the dam; and means for withdrawing the material and substances from the intercepting means.

3. A structure as set forth in claim 2, wherein means is provided for freeing the sealing material from contaminating substances and returning such sealing material to the holder.

4. A structure as set forth in claim 2, wherein means is provided for freeing the sealing material from contaminating substances, heating and returning such heated sealing material to the holder.

5. In a waterless gas holder, the combination of a shell; a piston-like closure mounted therein; means carried by the piston and bearing against the inner wall of the shell to effect a gas seal in conjunction with the sealing material; a dam located within the lower portion of the shell adapted to receive sealing material; a second dam located above the lower dam, both of said dams extending entirely around the inner surface of the shell; means for withdrawing the substances which may pass from the holder wall into the upper dam; and means for removing extraneous matters from the sealing material and returning such purified material back to the holder.

In testimony whereof I have signed my name to this specification.

HENRY C. A. MEYER.