

(No Model.)

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APPARATUS FOR OBTAINING RESIDUUM CONTAINED IN WATER
USED IN THE MANUFACTURE OF GAS.

No. 506,670.

Patented Oct. 17, 1893.

Fig. 1.

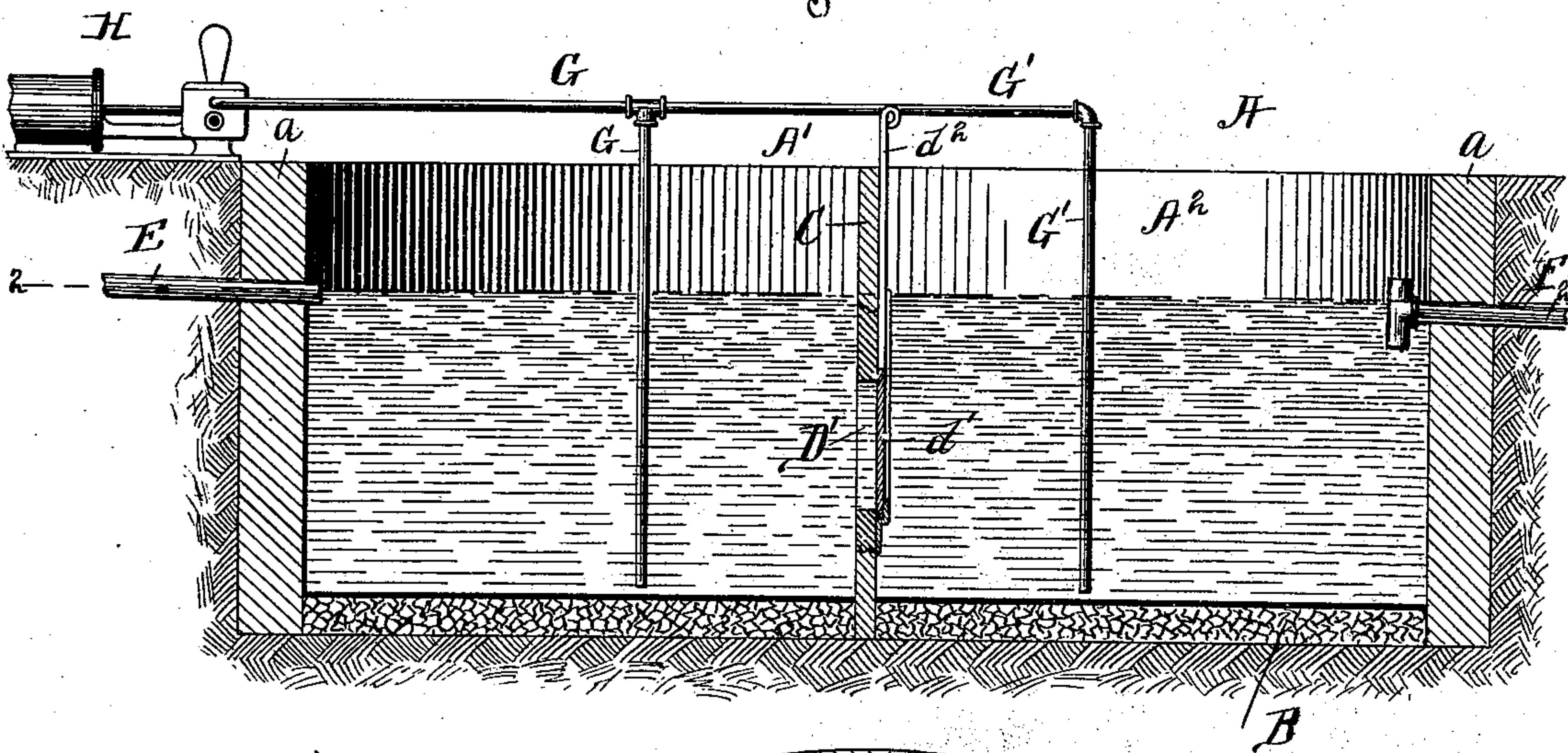
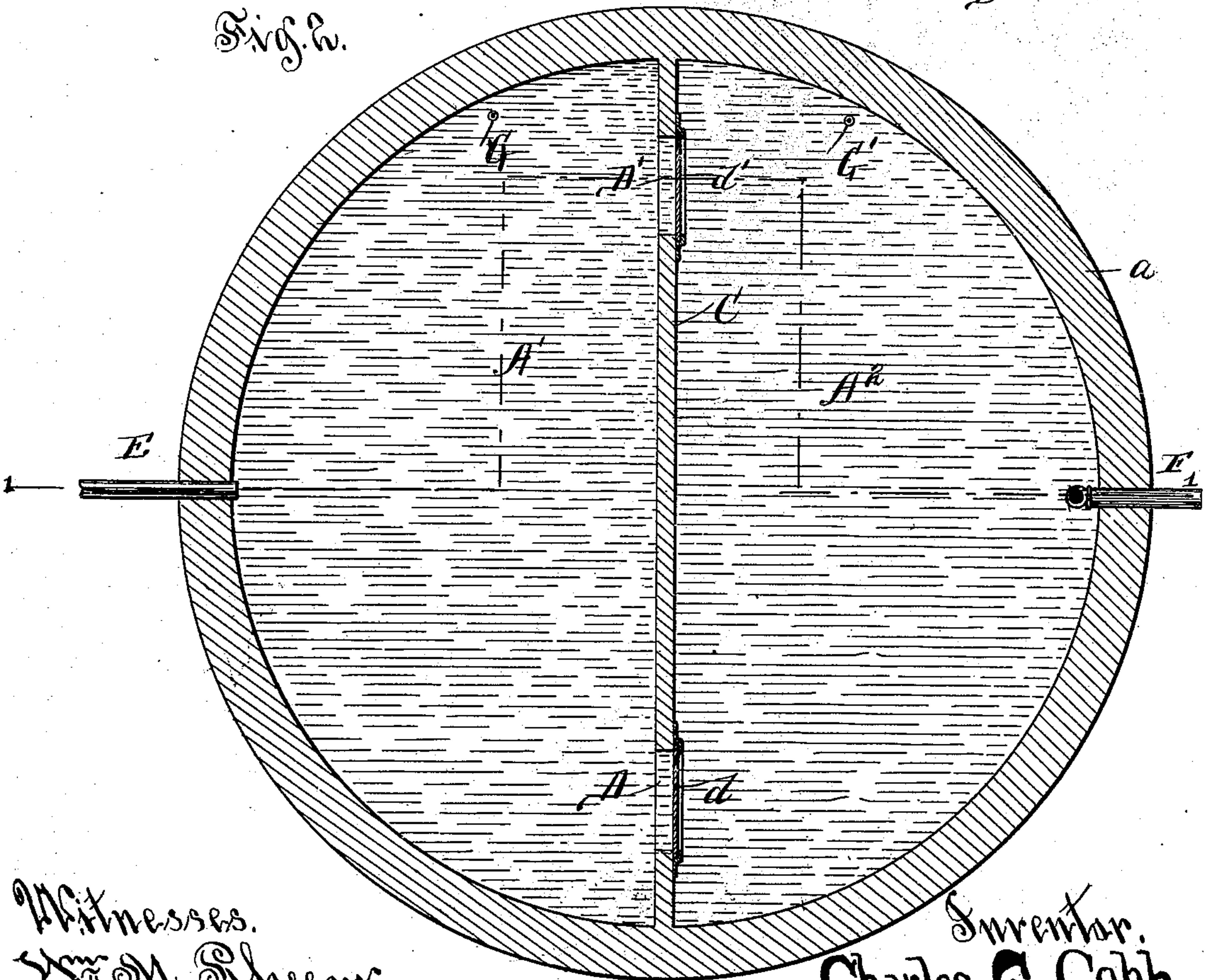


Fig. 2.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR OBTAINING RESIDUUM CONTAINED IN WATER USED IN THE MANUFACTURE OF GAS.

SPECIFICATION forming part of Letters Patent No. 506,670, dated October 17, 1893.

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To all whom it may concern:

Be it known that I, CHARLES G. COBB, a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Apparatus for Obtaining the Residuum Contained in Water Used in the Manufacture of Gas and other Materials, of which the following, in connection with the drawings accompanying and forming a part hereof, is a description sufficient to enable those skilled in the art to understand and practice the same.

In the manufacture of gas by many of the processes now in common use, there is contained in the water discharged from the several machines and devices employed in such manufacture a residuum which consists of tar or tarry compounds, and light oils. The specific gravity of the oils is less than the specific gravity of the water containing it, and the specific gravity of the tar or tarry compounds is slightly greater than the specific gravity of such water, and the object of my invention is to provide an apparatus whereby both of such residual products can be taken from the water before such water is discharged or run to waste.

To better understand the object and purpose of my invention, it should be borne in mind, that when, as is ordinarily the case, the water discharged from the manufacture of gas is allowed to run to waste into a stream of water with the residual products consisting of tar and tarry compounds and light oils contained therein, such products, or some of them, may, and very frequently do become ignited and burn upon the surface of the water, thus endangering, in cases where the gas plant is situated where the body of water into which the waste is allowed to run is contiguous to buildings or lumber yards, great danger from fire; and further that the residual products referred to are, when separated and properly treated, of considerable value greatly in excess of the cost of obtaining the same.

The manner in which I obtain the results sought by me is to subject the water containing the residual products to such a process or treatment as will remove therefrom both the tar or tarry compounds and the light oils, and

such process may be briefly stated to be as follows: First, the water is conducted into one or more wells or sinks constructed as hereinafter described and allowed to remain therein sufficiently long for the tar or tarry compounds to sink to the bottom, and of the light oils to rise to the top of the water contained in the sink or well; second, in pumping such tar or tarry compounds from such sink or well without removing the water thereover from the well or disturbing it while in the well, and third, in removing the light oils from the surface of the water while contained in such well.

In the practice of my invention it has not been found practicable to make a single well of sufficient area to properly remove all the residuum from the water discharged thereinto where large quantities of gas are manufactured, and in such cases more than one well, all however constructed substantially as the herein described well, is required, the waste water discharge pipe from the first well forming the inlet pipe into the next well, and so on through the series. I do not illustrate more than one of such wells in the drawings, because, as stated, each succeeding well is a duplicate of the one herein described and all of such wells enter into the process in substantially the same manner as the first one thereof enters thereinto.

In the drawings Figure 1, is a cross-sectional view of the sink or well on line 1—1 of Fig. 2, and Fig. 2, is a sectional view on line 2—2 of Fig. 1.

Similar letters of reference are used to indicate the same part, where more than one view thereof is shown in the several figures of the drawings.

A, is a sink or well, constructed preferably of masonry having the side wall or walls *a*, and the concrete bottom B, the well being so arranged that water or other liquid cannot pass through the walls or bottom thereof, either to or from such well. This well may be either round, square or oblong, as preferred.

C, is a partition wall separating the well or sink A into two compartments.

D, D', are holes in the partition wall C, whereby liquid contained in one of the com-

partments, as A', can be admitted into the other one thereof, as A²; and *d*, *d'*, are gates, whereby the quantity of liquid admitted from one compartment into the other is controlled.

5 Gates *d*, *d'*, are, respectively, raised by means of rods *d*², *d'*².

E, is the inlet pipe by which the liquid is admitted into the compartment A' of the well; and F, is the discharge pipe whereby the liquid is removed from the other, A², of such compartments.

Where more than one well is used, as hereinbefore stated, the discharge pipe F of the well A becomes in its turn the inlet pipe of the next adjacent well.

15 G, G', are pipes extending from near the bottom of the compartments A', A², respectively, to pump H.

The manner in which my process is operated will be readily understood, by inspection of the drawings, to consist of the following steps: First, the liquid, as water, containing the tar or tarry compounds and the light oils, is admitted in compartment A' of the well. A gradually filling such compartment, and the gates *d*, *d'*, being open also gradually filling the second compartment A². Without confining myself to any dimensions herein stated, but that the process may be definitely understood, I will state that the diameter of the well where the same is circular in form, has heretofore been made from forty to fifty feet, and the depth thereof from fourteen to eighteen, the liquid contained therein, being, say, of a depth of ten feet, and the inlet and outlet pipes E, F, of a diameter of, say, from six to ten inches. In order that the flow of liquid through the openings D, D', shall not interfere with the tar or tarry compounds settled in the bottom of the compartment, or with the light oils floating on the surface of the water or such liquid, it is necessary that such openings D, D', shall be placed above the designed surface of the tar or tarry compounds settled on the bottom of the several compartments and below the light oils floating in the well.

The proportions of the well and of the inlet and outlet pipes should be such that very little current obtains in the well, and the pipes G, G', by means of which when the pump H is operated, the tar or tarry compounds are moved from the well, should be placed in the well so that, but little, if any current or movement of the liquid contained in the well shall occur near them.

55 The light oils floating on the top of the liquid are by me removed by skimming them off therefrom.

The tar or tarry compound and the light oils removed by my process can be afterward suitably treated to obtain a commercial product, but said treatment forms no part of my invention.

65 It will be evident that the herein described process of removing tar and tarry compounds and oils from waste liquid, as water, is not confined to cases where the residuum consists

of the herein named products, but is equally applicable to other manufactures wherein such residuum is of different specific gravity than the liquid in which it is contained, as for instance the removal of oil or fatty compounds and animal and vegetable products of different specific gravity, usually heavier than water, which are mixed with water wasted from slaughter houses; and the herein described process is admirably adapted to be used in relation to slaughter houses for the removal of the residuum contained in the liquid wasted therefrom.

Where all the residuum matter contained in the liquid is of greater specific gravity than such liquid, it is evident that all of such residuum will fall to the bottom of the well, and hence that portion of the herein described process which consists in skimming off of the surface of the liquid in the well the material floating thereon will be omitted. It is also evident that where the area of the well is suitably proportioned with the area of the inlet and discharge pipes, the herein described process is a continuous process, that is, a process admitting a continuous admission of liquid from pipe E to the well A and a continuous discharge of liquid from outlet F.

It is to be understood that by the use of the term "well or sink," I do not confine myself to the use of a receptacle wholly or partially embedded in the earth, although in practice the receptacle has been so constructed, that is, sunk or built into the earth, as the receptacle may be built entirely above the ground, (and not of masonry,) supported on suitable foundations. In such cases it would be ordinarily found necessary to pump the liquid into the well or receptacle, while the tar or tarry compounds obtained therefrom could be allowed to run, by gravity, through a discharge pipe therefor extending out of the bottom of the receptacle.

In the use of this process, the gates *d*, *d'*, may be wholly or partially open, dependent upon the rapidity with which the residuum material of greater specific gravity than liquid will settle therein, or one of the gates may be partially or wholly open, while the other is fully closed, as preferred.

The outlet pipe F is turned down as is illustrated in Fig. 1, of the drawings in the well A so that the end thereof shall be below the surface of the liquid contained in the tank in order that none of the light oils or fats floating on the surface of the liquid shall pass out of such outlet pipe F.

By the use of my apparatus with chambers having large openings between the two sections thereof advantages are obtained that cannot be had in any other apparatus with which I am acquainted. It must be understood that if two receptacles are used, having but a small outlet, the material mechanically suspended in the liquid in the first receptacle having commenced to settle or become precipitated, will, in the liquid passing to a

second receptacle, become again thoroughly mixed with the liquid, and the entire settling or precipitation will have to be gone over again with the disadvantage also that the coarser material held in suspension having risen to the top, or sunken to the bottom in the first receptacle, the material held in suspension in the second receptacle will be much less liable to settle or rise at all, and, in any event, will require much longer time than is required in the first receptacle, and the two receptacles will not work in unison, but in using a receptacle with two compartments divided by a comparatively thin partition, and having a large opening through the partition as compared with the inlet to the first receptacle, and the outlet to the second receptacle, no remixing of the material held in suspension in the liquid with such liquid will occur in the liquid as it passes from the first to the second receptacle. And again, having two compartments in one receptacle with the opening underneath the surface of the liquid in the above compartments, the movement of the liquid through the partition will be so gentle that no material which has risen above the opening in the partition, as well as none which has settled below such opening, will pass through into the second compartment.

By my apparatus, the two advantages above set forth are obtained, and in addition thereto materials of differing qualities may be obtained in the two receptacles, as the lightest material of all will rise in the first compartment, and the heaviest of all will sink to the bottom thereof, while in the second compartment a rather heavier material will be found at top than has risen in the first chamber, and a lighter sediment will be obtained in the second chamber.

Of course when there are two distinct cham-

bers with a small outlet from one to the other, different matters may be separated, but in such case the rising of the lighter matters and the settling of the less heavy materials in the second chamber will not be nearly so rapid as where there is a double chamber with a free communication between the sections.

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

An apparatus for obtaining residual material from liquids, consisting of a receptacle, a partition wall in such receptacle dividing it into more than one compartment, an inlet pipe into the first of such compartments and an outlet pipe from the last thereof, a communicating opening extending through the partition wall between adjacent compartments, such opening being above the bottom of the receptacle and below the outlet pipe from the last compartment of the receptacle and of such size as to allow liquid to flow from one compartment to the adjacent compartment without disturbing the separation of residuum from the liquid which passes through the opening, an inlet to the outlet pipe from the last compartment below the surface of the liquid in the receptacle, and a pipe extending from near the bottom of each compartment of the receptacle to a pump; whereby the contents of the receptacle contained on the bottom thereof can be removed therefrom without agitation of the liquid thereover, and liquid is continuously discharged from one compartment of the receptacle to the adjacent compartment, and from the receptacle, from between the upper and lower layer of residuum in the receptacle; substantially as described.

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Witnesses:

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