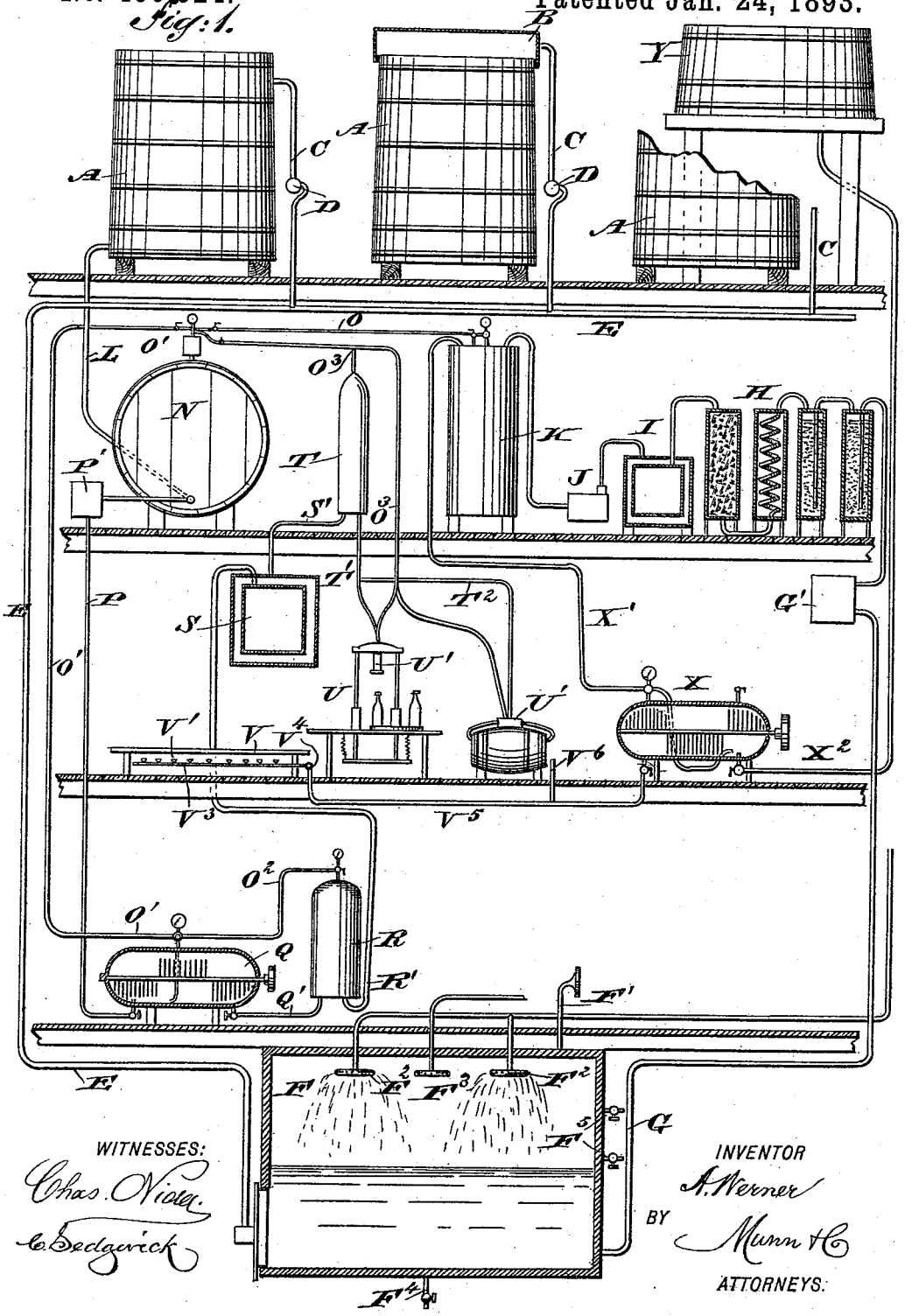
(No Model.) 2 Sheets—Sheet 1.

A. WERNER.

METHOD OF AND APPARATUS FOR THE MANUFACTURE AND FILLING OF LIQUIDS.

No. 490,524. Patented Jan. 24, 1893.

Fig: 1.



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(No Model.) 2 Sheets—Sheet 2.

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Fig: 2.

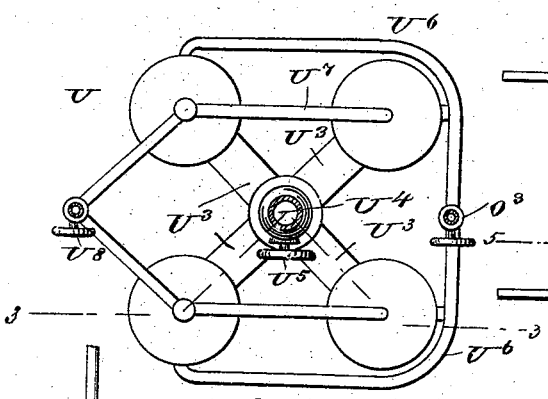


Fig: 4.

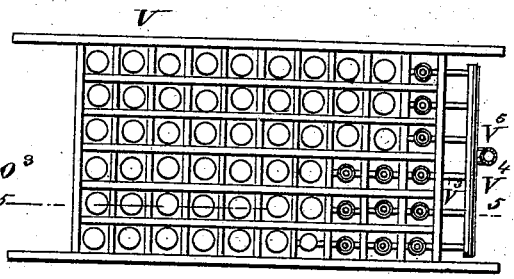


Fig: 3.

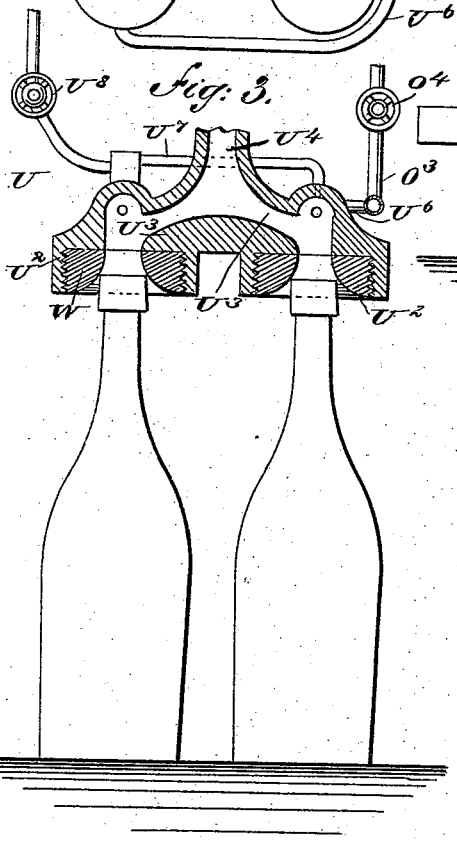
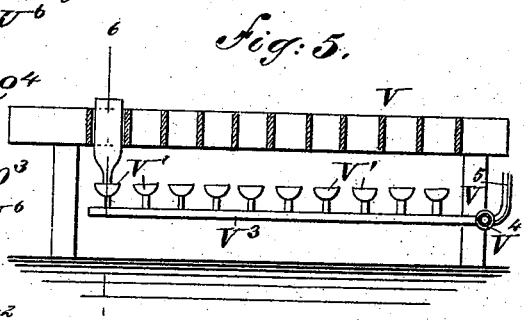


Fig: 5.



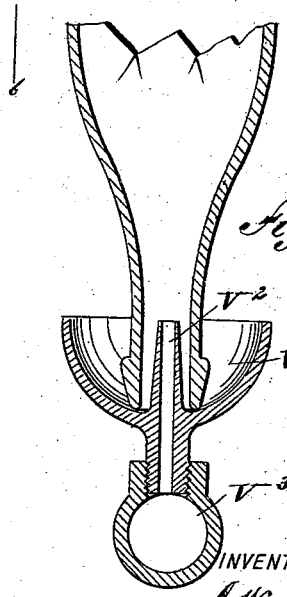
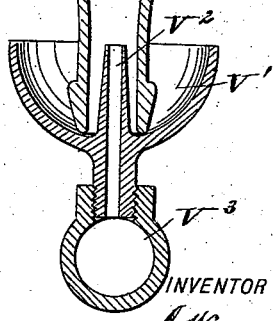


Fig: 6.



WITNESSES:

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UNITED STATES PATENT OFFICE.

AUGUST WERNER, OF BROOKLYN, NEW YORK.

METHOD OF AND APPARATUS FOR THE MANUFACTURE AND FILLING OF LIQUIDS.

SPECIFICATION forming part of Letters Patent No. 490,524, dated January 24, 1893.

Application filed July 14, 1892. Serial No. 440,046. (No model.)

To all whom it may concern:

Be it known that I, AUGUST WERNER, of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in the Method of and Apparatus for the Manufacture and Filling of Liquids, of which the following is a full, clear, and exact description.

The object of the invention is to provide certain new and useful improvements in the manufacture and filling of liquids such as beer, in a very simple, economical manner, preventing any waste of the gases arising during the process of fermentation by using the gases when filling the liquid into the kegs or barrels, so that the filled liquid will not readily spoil but on the contrary, will keep for almost any desired length of time.

The method consists in collecting in a reservoir, the gaseous products of fermentation arising from the liquid in the fermenting tun, then purifying the said gases to produce carbonic acid gas and storing the same in a vessel, then mixing this carbonic acid gas with the beer previously drawn from the fermenting tun and then filling the charged liquid into barrels or kegs.

The invention further consists of an apparatus of special construction for carrying this method into effect.

The invention also consists of certain parts and details and combinations of the same, as will be hereinafter fully described and then pointed out in the claims.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation of the apparatus with parts in section; Fig. 2 is an enlarged plan view of the filling head; Fig. 3 is a sectional side elevation of the same on the line 3—3 of Fig. 2; Fig. 4 is a plan view of the grate for supporting the bottles and charging the same with gas; Fig. 5 is a sectional side elevation of the same on the line 5—5 of Fig. 4; and Fig. 6 is an enlarged sectional side elevation of the device for charging the bottles with gas preparatory to filling the same.

The ordinary fermenting tun A contains the liquid during the process of fermentation, the said liquid almost always filling the tun to the top. The tun is temporarily increased in length by a ring or open hood B set on the open top of the tun, preferably on a rubber ring or washer fitted over the outside of the tun, and forming a seat for the ring B. This hood B on the upper end of the tun is connected by a pipe C containing a trap D, with a pipe E leading to a reservoir F of suitable size and shape, so as to store a large quantity of the gaseous products of fermentation arising from the several tuns used in a large establishment.

It is understood that the ring or hood B is moved from time to time from one tun to another so that the gaseous products of all the tuns are collected and delivered and stored in the reservoir F. The latter is provided at its top with an air outlet F′ which is always open to let air in and out of the reservoir. The latter is preferably partly filled with water and provided with water washing devices F^2 and steam devices F^3 for cleaning the reservoir whenever necessary.

In the bottom of the reservoir is arranged an outlet pipe F^4 for discharging the wash water and impurities, the said outlet being however, closed during the time gases are collecting in the reservoir. Gas outlet valves F^5 are also formed in one end of the reservoir to examine the state of the gas contained in the reservoir A. The gases can be withdrawn from the reservoir F, through a pipe G connected with a pump G′ which serves to draw the gases from the reservoir F and force the same through a purifying apparatus H of any approved construction, the partly purified gases finally passing through a filter I into a pump J, which pumps the completely purified gases into a closed storage tank K.

After the liquid in the tun A has undergone the fermentation process, then it is drawn through pipes L into a storage cask N which holds the ruh beer until it is in condition for filling it into bottles or barrels, kegs, and similar receptacles. This cask N is connected at its top by a pipe O with the top of the storage tank K, so that the cask N is filled with gas, as the liquid is drawn therefrom, to prevent any atmospheric air from passing into the cask. The cask is connected with an outlet pipe P containing a pump P′ for regulating the flow of the liquid into a charging appa-

ratus Q of any approved construction, and connected by a pipe O′ with the aforesaid pipe O or directly with the tank K, so that the liquid from the latter passes into the said mixing apparatus, and is mixed therein with the liquid from the cask N. The liquid is thus charged continuously with the purified gas originally contained in it as above described. The charged liquid is then passed from the mixer Q into a settling chamber R connected by a pipe O^2 with the gas pipe O′ so that the same pressure is maintained within the settling chamber R on the liquid, that is in the mixing apparatus Q and the cask N.

The settling chamber R is connected at its bottom with a pipe R′ leading to a filter S connected by an outlet pipe S′ with a resistance receptacle T located alongside the cask N and connected at its upper end with a pipe O^3, either directly connected with the tank K or with the gas pipe O so that the liquid contained in the filter is under the same pressure as that maintained in the cask N. The resistance receptacle T is connected by a pipe T′ with the head U′ used on the bottling table U for filling the liquid into bottles, or it is used in connection with a barrel for filling the liquid into a barrel, as will be readily understood by reference to Fig. 1, both filling devices being illustrated.

For bottling, the head U′ is formed with a series of inlets U^2 adapted to connect with a corresponding number of bottles so that the latter are simultaneously filled. Each inlet U^2 is formed on the under side with a rubber gasket or seat W adapted to engage the mouth of the bottle so that a tight connection is made between the latter and the inlet, as will be readily understood by reference to Fig. 3. Each inlet U^2 is connected by a channel U^3 with a common liquid inlet U^4 having a valve U^5 and connected by the pipe T′ with the resistance receptacle T. Each of the inlets U^2 is connected with a gas supply pipe U^6 connected with the pipe O^3, deriving its supply from the tank K, as previously stated. A valve O^4 is arranged in this pipe O^3, so as to regulate the flow of the gas to the several inlets U^2. The said inlets are also connected with an air discharge pipe U^7 provided with a valve U^8 and leading to the outer air. The valve U^8 is left open from the previous bottling and when a new set of bottles are under the head U′, as shown in Fig. 3, and it is desired to fill the same with the already charged liquid, then the operator first opens the valve O^4, so as to permit the gas to flow into the several bottles and to drive out the air contained therein. The valve U^8 is then closed and the bottles will fill with gas up to the same pressure as in the charged liquid. The valve U^5 is then opened so that the liquid flows into the bottles under its own hydrostatic pressure and fills the same without foaming, and when full, the valves U^5 and O^4 are closed and the air valve U^8 is opened to let off the pressure from the liquid. The valve U^8 is opened but for a moment. The table supporting the bottles is lowered in the usual manner to disconnect the bottles from the head, a supply of empty bottles is then placed on the table, the latter is raised to again connect the empty bottles with the inlets U^2, and the above described operation is repeated. Preparatory to filling the bottles, the latter are washed and charged with gas from the tank K. From this apparatus the empty bottles are supported in an upside down condition in a grate V, having the usual compartments, one for each bottle. The downwardly-extending mouth of each bottle passes into and is supported by a cup V′ containing in its center a nozzle V^2 which opens into the mouth of the bottle, as plainly illustrated in Fig. 6. This nozzle V^2 is screwed into a longitudinally extending pipe V^3 connected with a transversely extending pipe V^4 in which lead all the longitudinal pipes V^3. This pipe V^4 is connected by a pipe V^5 with a mixing apparatus X of any approved construction, and connected by a pipe X′ with the tank K which furnishes the necessary gas supply. The apparatus X is also connected by a pipe X^2 with a tank Y, containing pure water, which flows into the mixing apparatus X and is charged therein with the carbonic acid gas coming from the tank K. This mixture of gas and water flows through the pipe V^4 into the several nozzles V^2 from which it sprays into its bottle so as to wash the same, at the same time charging it with gas which separates from the water and is carried along by the same.

The mouth of the bottle does not fit snugly in the cap V′ so that the water can readily escape on its down-flow from the bottle through the cup and over the edge of the same, but part of the water will remain in the cup and thus form a seal for the mouth of the bottle until the bottle is drawn out of the grate and put under the head U′ in connection with several others, as above described, for filling the several bottles simultaneously.

For barrels, the head U′ is provided with but a single gas inlet, a single liquid inlet and a single air outlet; otherwise, the operation is the same as above described in reference to the filling of the bottles. The barrel, previous to filling, is washed with the mixture of water and gas coming from the mixing apparatus X, through the pipe V^5, which latter is for this purpose provided with a branch pipe V^6, as shown in Fig. 1. The head U′ used for filling a barrel, is temporarily locked to the latter by a suitable mechanism, so that the head fits snugly over the bung-hole and no air can pass into the same.

It will be seen that the gaseous products of fermentation arising in the several tuns are utilized in such a manner as to finally combine again with the original liquid, at the same time the gases assist in purifying the receptacles to be filled and keeping the same clean and fresh under total exclusion of atmospheric air. The liquid treated in this manner

and finally filled into bottles or barrels for the market, is not liable to spoil and will keep for a considerable length of time.

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

1. The herein described method of gathering the gaseous products of fermentation in the fermenting tun and permitting the same to flow by their own gravity to a collecting reservoir, then withdrawing the gases from the latter and purifying the same by passing the gas through a purifier to produce pure carbonic acid gas, storing this gas under pressure in a tank, drawing the liquid from the fermenting tun and storing it in a storage cask, drawing this stored liquid from the storage cask and part of the gas contained in the said tank simultaneously into a mixing device to charge the said liquid with the said purified carbonic acid gas preparatory to filling the liquid into bottles or kegs, filling the charged liquid into bottles or kegs and maintaining on the liquid in the said storage cask and in the bottles or kegs during the filling operation a uniform pressure derived from the gas in the said tank, substantially as shown and described.

2. The herein described method for treating liquids consisting of gathering the gaseous products of fermentation in the fermenting tun and permitting the same to flow by their own gravity to a collecting reservoir, then withdrawing the gases from the latter and purifying the same by passing the gas through a purifier to produce pure carbonic acid gas, storing this gas in a tank and then charging the liquid with the said purified carbonic acid gas preparatory to filling the liquid into bottles or kegs, withdrawing part of the purified gas from the tank and mixing it with water to form a wash water for washing the bottles or kegs before filling the same, substantially as shown and described.

3. In an apparatus of the class described, the combination with a fermenting tun, of a hood adapted to be temporarily secured thereon, a reservoir connected with the said tun at the upper end thereof, a purifying device connected with the said reservoir to purify the gaseous products of fermentation to form pure carbonic acid gas, a tank for storing the said carbonic acid gas, a storage cask adapted to receive the liquid from the said fermenting tun, a charging device connected with the said tank and with said storage cask containing the liquid drawn from the said fermenting tun, means for connecting the said storage cask with the said tank to maintain a pressure in the said cask corresponding to that in the said tank, and a filtering device connected with the said charging apparatus and with the said tank, substantially as shown and described.

4. In an apparatus of the class described, the combination with a fermenting tun, of a hood adapted to be temporarily secured thereon, a reservoir connected with the said tun at the upper end thereof, a purifying device connected with the said reservoir to purify the gaseous products of fermentation to form pure carbonic acid gas, a tank for storing the said carbonic acid gas, a mixing apparatus connected with the said tank and also connected with a fresh water supply so as to mix the water with the said carbonic acid gas, and a pipe leading from the said mixing apparatus and connected with washing devices for washing the bottles or barrels with the said mixture of water and carbonic acid gas, substantially as shown and described.

AUGUST WERNER.

Witnesses:
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EDGAR TATE.