No. 883,640. PATENTED MAR. 31, 1908.

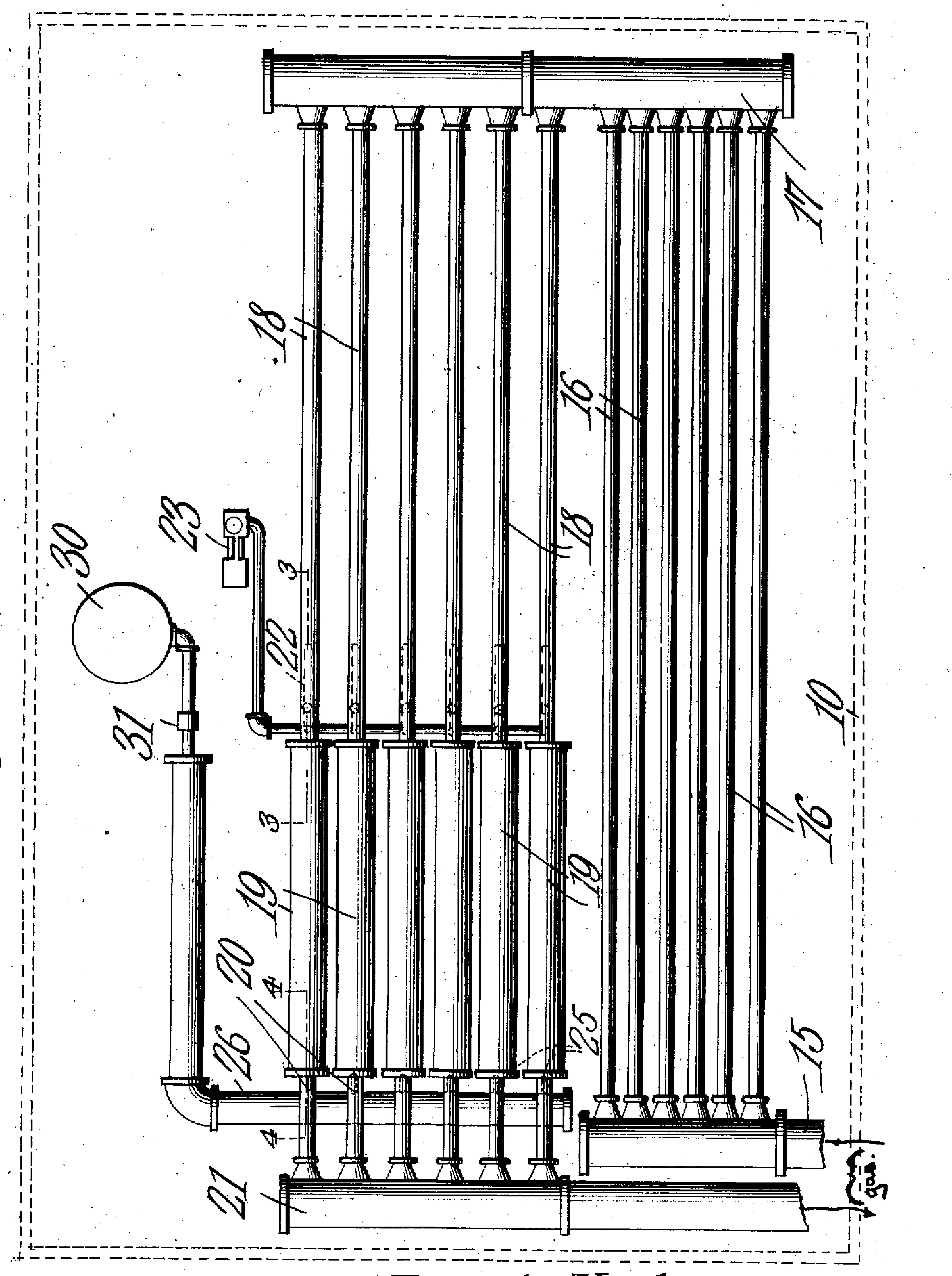
D. HASTINGS & A. W. BRINK.

METHOD OF COOLING GAS AND SEPARATING GASOLENE THEREFROM.

APPLICATION FILED APR. 6, 1907.

2 SHEETS—SHEET 1.

Fig. 1.



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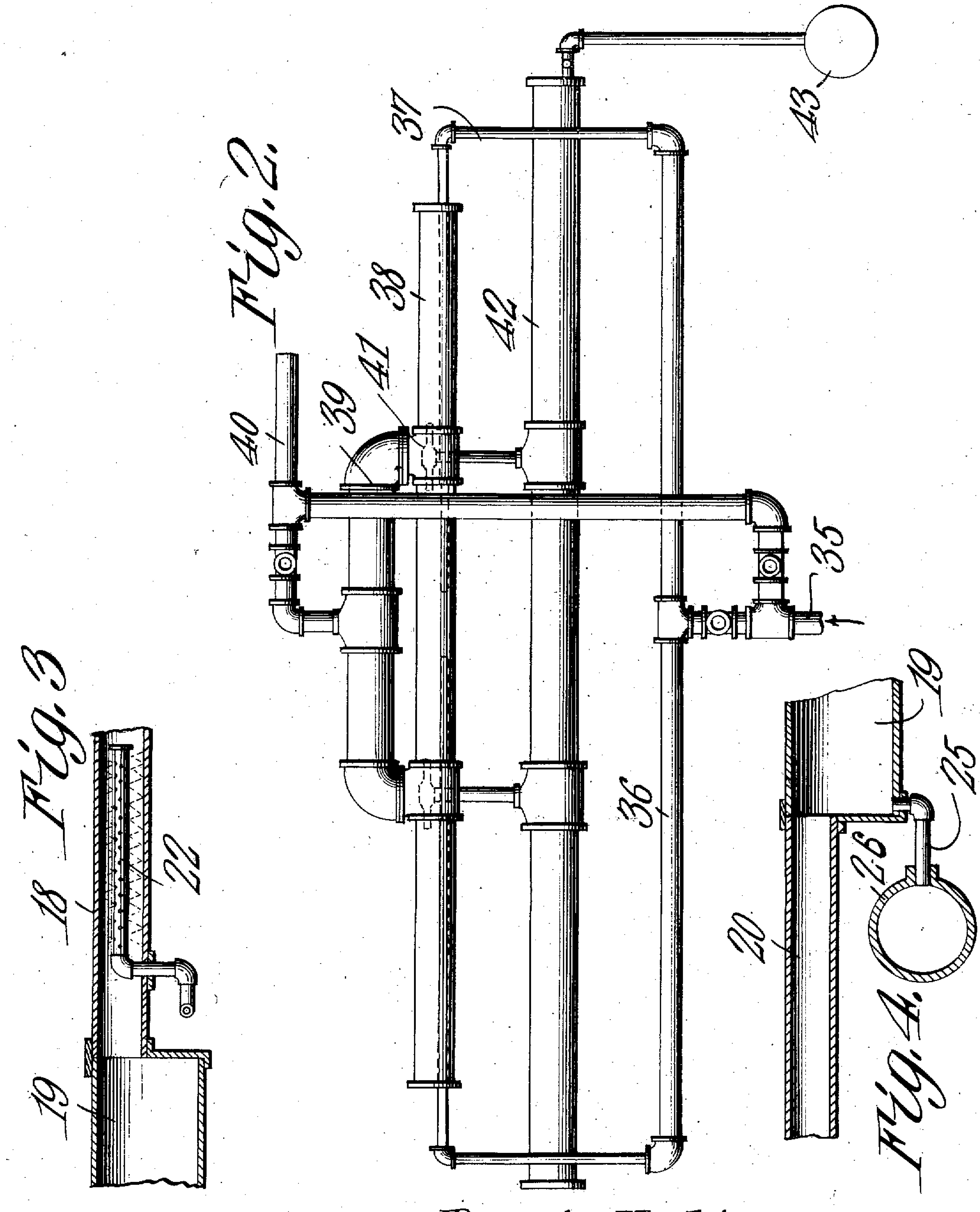

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UNITED STATES PATENT OFFICE.

DENNIS HASTINGS AND ANDREW W. BRINK, OF OKLAHOMA, OKLAHOMA.

METHOD OF COOLING GAS AND SEPARATING GASOLENE THEREFROM.

No. 883,640. Specification of Letters Patent. Patented March 31, 1908.

Original application filed December 10, 1906, Serial No. 347,148. Divided and this application filed April 6, 1907. Serial No. 366,788.

To all whom it may concern:

Be it known that we, DENNIS HASTINGS and ANDREW W. BRINK, citizens of the United States, residing at Oklahoma city, in the county of Oklahoma, Oklahoma, have invented a new and useful Method of Cooling Gas and Separating Gasolene Therefrom, of which the following is a specification.

This invention relates to a method of cooling compressed gas and separating gasolene and other light hydrocarbons from natural gas at the compressing station or at the well.

A further object of the invention is to provide an improved method of separating gasolene and naphtha from natural gas and to wash and purify the gas in order to prevent deposits in the gas main and at the burner tips.

With these and other objects in view, the invention consists in the novel method hereinafter described and claimed.

In the accompanying drawings:—Figure 1 is a plan view, partly in the nature of a diagram of an apparatus for cooling compressed gas and separating gasolene therefrom to be used in carrying the method into effect. Fig. 2 is an elevation illustrating a slightly modified form of apparatus. Fig. 3 is a transverse sectional view of a portion of the device shown in Fig. 1, the view being on the line 3—3 of said figure. Fig. 4 is a similar view on the line 4—4 of Fig. 1.

Similar numerals of reference are employed to indicate corresponding parts throughout the several figures of the drawings.

The apparatus shown in Fig. 1 is located in a stream of running water or in a reservoir of water, as indicated at 10.

The gas under compression enters through a header 15, and passes through a plurality of pipes 16 to an intermediate header 17, from which the gas flows at slightly reduced temperature through a series of pipes 18 which lead to separating pipes 19 of greater diameter than the pipes 18, and thence flows from the pipes 19 through smaller pipes 20 to a header 21, from which the gas is carried to a holder or to the point where it is to be used.

Near the discharging end of each of the pipes 18 is arranged a liquid spray tube 22, through which water or oil is forced under pressure from a suitable pump 23, the liquid being atomized, so as to more thoroughly intermingle with the stream of gas.

The atomized liquid is preferably at a low temperature and reduces the temperature of the gas to a considerable extent, it being understood that the gas under natural or artificial pressure is highly heated.

The mingled gas and water or oil passes into the separating pipes 19 which, being of larger diameter than the pipes 18, permits expansion of the gas and slightly checks the speed at which the streams of gas are moving, so that there is ample opportunity for the separation of the gasolene and other light hydro-carbons, and impurities from the gas proper.

All of the liquid will flow by gravity to the lower portions of the pipes 19, while the gas is free to pass off through the pipe 20 to the discharge header 21.

The liquid flows from the discharge end of each pipe 19 through a small pipe 25 to a receiving pipe 26, from which it flows by gravity, or is pumped to a collecting tank 30, the liquid passing through an automatic trap or traps 31 in order to prevent the passage of the gas into the receiving tank.

If water is used, the gasolene separates therefrom by gravity and can be readily drawn off into a storage tank. If oil is used, or fluids other than water, such fluid, when gathered into the collecting tank, with the gasolene, can be used over and over by connecting the lower portion of the tank to the suction side of the force pump 23.

It is found in practice that where the gas is heated by high compression and cooled in the manner described, the sudden change in the temperature of the gas precipitates a quantity of gasolene therefrom; and this is found to be a very economical and profitable method of gathering gasolene without interfering with the flow, or reducing the candle power of the gas. A further advantage gained is that by reducing the temperature of the gas, the friction in the pipe line is considerably reduced, and as the impurities are separate from the gas during the washing process, there is less deposit in the pipe lines.

Where the invention is used in connection with natural gas, either at the well or at any point in a pipe line leading therefrom, the structure is modified as shown in Fig. 2. In this case the pipe 35 through which the stream of gas flows from the well, is connected to two branch pipes 36, and thence flows through smaller pipes 37 into a liquid reservoir 38 which in the present instance is shown in the form of an elongated tube.

The inner portions of the pipes 37 are provided with numerous perforations through which the gas flows in minute streams, and the pipes are submerged in the liquid in said reservoir 38, so that the gas is compelled to pass through the liquid, and in so doing will be cooled, and at the same time will permit the separation therefrom from the gasolene and other light hydro carbons, after which the gas passes off through pipes 39 to a discharge pipe 40.

The gasolene separates from the liquid in the reservoir 38 by gravity, rising to the top of such liquid, and flowing off through pipes 41 to a receiving pipe 42, and thence passing to a storage or collecting tank 43. By using this device, the gasolene is separated from the natural gas at very slight expense, without stopping the flow of the gas, and without decrease in the candle power thereof.

We claim:—

The herein described method of separating gasolene from a stream of flowing gas under pressure, said method consisting in spraying jets of water transversely across the path of the stream of gas while under pressure thereby forming a wall of water divided into a plurality of jets for contact with all portions of the gas stream, allowing the gas to expand immediately after its passage through the wall of water and conducting the expanding volume of gas in a horizontal path for a considerable distance to permit deposit of moisture and impurities without contact of such moisture and impurities with the body of gas preceding or following that from which it is deposited and at the same time subjecting the gas to the action of a cooling agent.

In testimony that we claim the foregoing as our own, we have hereto affixed our signatures in the presence of two witnesses.

DENNIS HASTINGS.
ANDREW W. BRINK.

Witnesses:
THEODORE ENDERLEIN,
C. HISER.