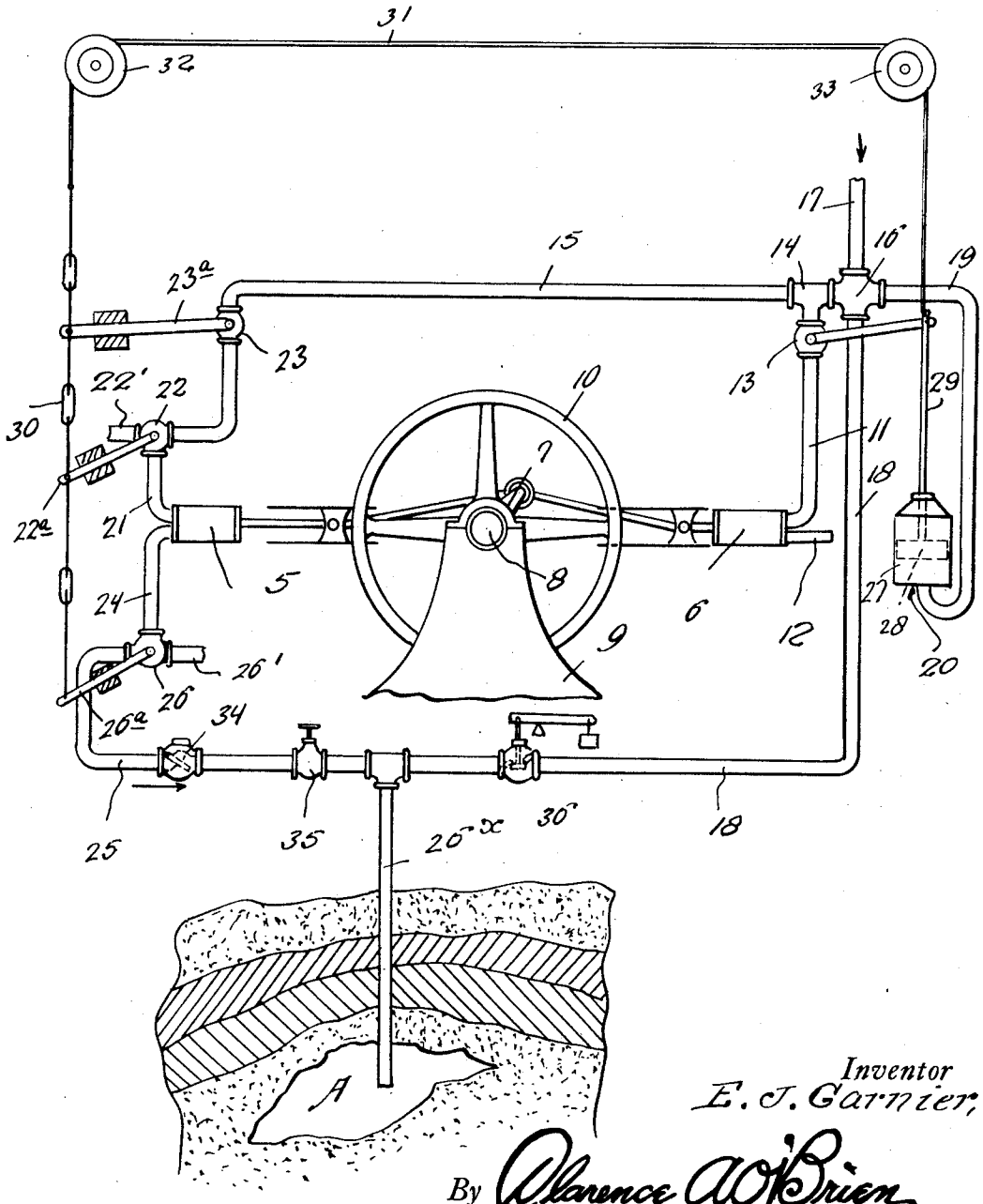
Aug. 7, 1928. 1,679,417

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GAS PUMPING SYSTEM

Filed May 17, 1926 2 Sheets-Sheet 1

Fig. 1.



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Fig. 3.

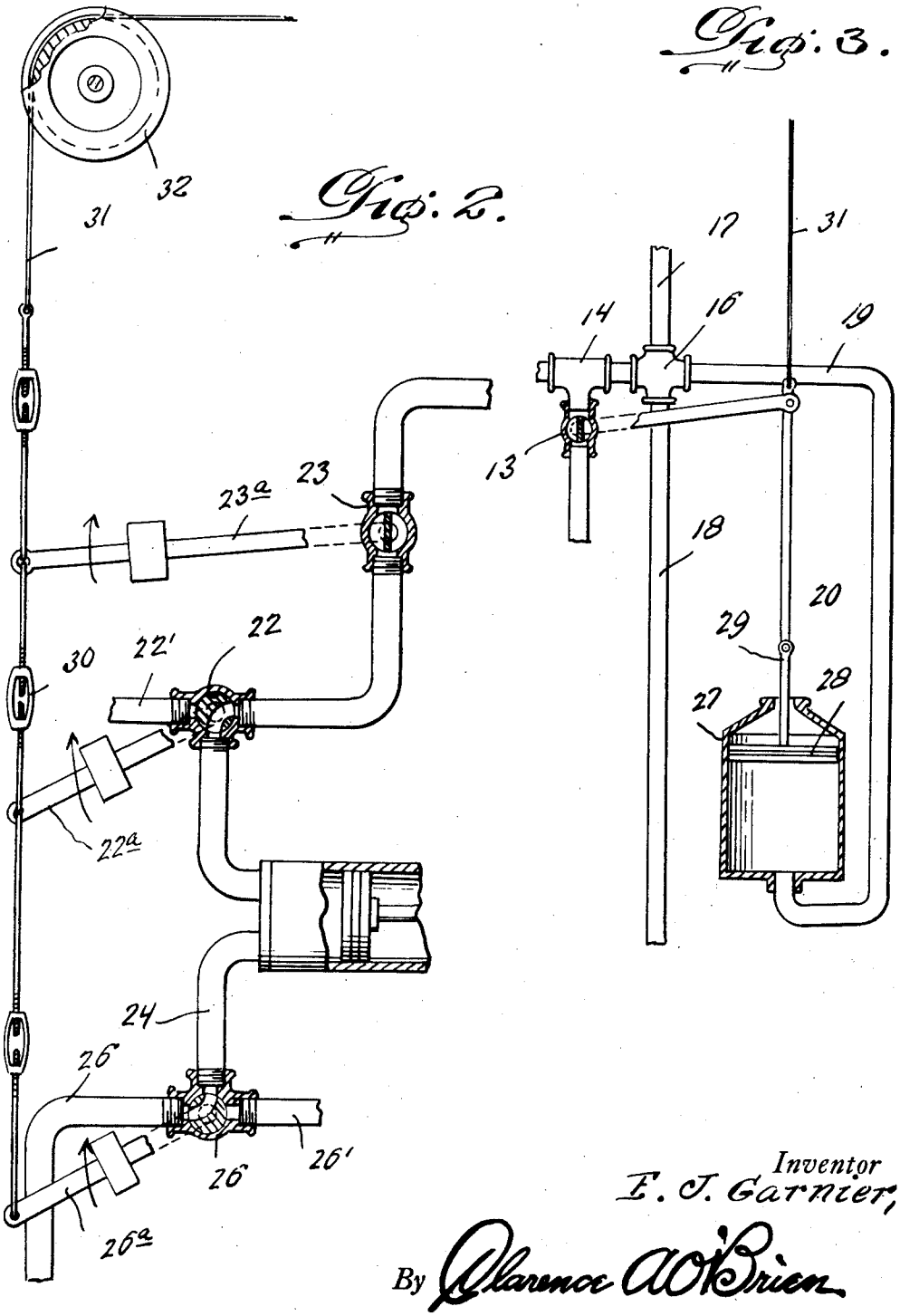


Fig. 2.

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UNITED STATES PATENT OFFICE.

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GAS-PUMPING SYSTEM.

Application filed May 17, 1926. Serial No. 109,666.

This invention relates to a gas pumping system for use in the storing of natural or artificial gas and aims to provide means whereby the natural or artificial gas which is usually in a substantially uncompressed condition may be stored within a natural or artificial earth pocket in compressed condition.

The invention further aims to provide a power plant for the compressing unit that is so constructed and associated with the system as to employ the natural or artificial gas for the operation of the engine when the system is in use.

Other objects will become apparent as the nature of the invention will be better understood, the same comprising the novel form, combination and arrangement of parts hereinafter more fully described, shown in the accompanying drawings and claimed.

In the drawings wherein like reference characters indicate corresponding parts throughout the various views:

Figure 1 is an elevational view of the system.

Figure 2 is an enlarged fragmentary view of certain correlated structural details of the system partly in elevation and partly in cross section, and

Figure 3 is a view similar to Fig. 2 of certain of the other correlated structural elements of the system.

Now having particular reference to the drawings, the invention consists of a gas compressor pump 5 and an explosion engine 6 in opposed relation therewith, the piston rods of the pump and engine respectively being operatively connected to the crank portion 7 of a shaft 8 journaled upon a standard 9 and with which is associated a fly wheel 10 in order that the operation of the engine will occasion the operation of the pump.

The internal construction of the engine 6 is conventional including among other elements not disclosed an intake pipe 11 and an exhaust pipe 12. The intake pipe 11 is equipped with a butterfly valve 13 that has communication with a T coupling 14 that serves as a connection between a gas conveying pipe for the pump 5 designated 15, and a four-way coupling 16 that serves as an attaching unit for a gas supply pipe 17, a back pressure pipe 18 and a gas conveying pipe 19 to a regulator designated generally 20.

The supply pipe 15 is attached to the compressor intake pipe 21 by reason of a two-way valve 22 while within the pipe 15 between said compressor intake and the gas intake 17 is a butterfly valve 23.

The exhaust pipe 24 from the compressor is connected to a compressed gas conveying pipe 25 by reason of a two-way valve 26 similar in all respects to the two way valve 22. Leading from the compressed gas conveying pipe 25 is an exhaust valve 26 that leads to a natural or artificial gas pocket A within the ground disclosed in Figure 1. At the other side of the pipe 26 is the back pressure pipe 18 previously described.

The regulator 20 previously mentioned consists of a cylinder 27 within which is rectilinearly movable a piston 28 from which extends a rod 29 leading from the cylinder. The pipe 19 enters the bottom of the cylinder and has trapped therein a predetermined amount of water or other liquid. The piston 28 is somewhat weighted and when the pressure of the gas within the pipe 19 falls below a certain predetermined degree, said piston will lower and cause the closing of the butterfly valve 13 to a predetermined extent by reason of the fact that the rod 29 is connected to the butterfly valve by means as more clearly disclosed in Figure 3. At this point it may be well to note that the butterfly valve 13 is set in order that the same will not totally close even though the piston 28 lowers entirely within the cylinder.

Leading from the two-way valves 22 and 26 are vent pipes 22′ and 26′ respectively, while attached to the cores of these valves are operating arms 22^a, 26^a respectively that are preferably weighted as disclosed. Also attached to the core of the butterfly valve 23 is a weighted operating arm 23^a, all of said arms being interconnected by an adjustable rod or cable designated generally 30 and from the upper end of which extends a flexible cable 31 trained over a pulley 32 and from there extending in a horizontal manner to a position above the regulator 20 at which point it is trained over another pulley 33 and thence attached to the connection between the piston of the regulator and the operating arm of the butterfly valve 13.

Within the pressure pipe 25 between the discharge pipe 26 and the compressor 5 is a check valve 34 and a hand controlled cut off valve 35 while within the return pipe 18

between the discharge pipe 26 and the union 16 is an automatic weight and pressure controlled valve 36.

In the operation of the system the valve 35 is opened, the gas engine 6 is started, and by reason of the even relatively low pressure of the gas entering the pipe 17 the same will so actuate the regulator as to open the butterfly valve 13 for thus increasing the speed of the engine, and rapidly operating the compressor 5. When the valve 13 is opened the valves 22 and 26 will be so actuated as to close the vent pipes 22′ and 26′ respectively. Consequently, the gas passing through the pipe 15 will be drawn into the compressor and thence compressed and discharged through the pipe 25, check valve 34, through pipe 26 into the cavity A in the ground. Should the pressure of the natural gas within pipe 17 drop below say a pressure of twelve pounds, the regulator will operate to close the valve 13 to idling position and due to the actuation thereof the valves 22 and 26 will be actuated to open the vent pipes for obviously permitting the pump to idle during the idling operation of the engine and the gas that has been compressed within the pocket A will flow through the pipe 18 to the engine.

It will thus be seen that I have provided a highly novel, simple, and efficient form of storage system for natural or artificial gas that is well adapted for all the purposes heretofore designated and even though I have herein shown and described the invention as consisting of certain detail structural elements, it is nevertheless to be understood that departures may be had therefrom without affecting the spirit and scope of the appended claims.

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

1. In a gas pumping system for natural or artificial gas the combination of a chamber for receiving the gas, a compressor, a gas engine for the operation of the pump, a natural gas supply pipe for the pump, and a natural gas supply pipe for the engine, a compressed gas delivery pipe leading from the pump to the gas receiving chamber and automatic means for lowering the supply of gas to the engine when the natural gas supply pressure falls below a predetermined amount.

2. In a gas pumping system for natural or artificial gas the combination of a chamber for receiving the gas, a compressor having communication with the gas receiving chamber, a gas engine for the operation of the pump, a single means for supplying natural gas to the engine and to the pump, and automatic means for lowering the supply of gas to the engine when the pressure of the gas falls below a certain predetermined amount.

3. In a gas pumping system for natural or artificial gas the combination of a chamber for receiving the gas, a compressor having communication with the gas receiving chamber, a gas engine for the operation of the pump, a single means for supplying natural gas to the engine and to the pump and automatic means for lowering the supply of gas to the engine when the pressure of the gas falls below a certain predetermined pressure, and automatic means for venting the pump when the supply pressure of gas to the engine is lowered.

4. In a gas pumping system for natural or artificial gas the combination of a chamber for receiving the gas, a compressor having inlet and exhaust vent pipes, a communicating pipe between the exhaust of the pump and said gas receiving chamber, a natural gas delivery pipe for the pump and for the engine, means operable under high gas pressure to close the pump inlet and exhaust vent, said means being operable to open position for permitting said pump to idle when the gas supply pressure to the engine reaches a predetermined low amount.

5. In a gas pumping system for natural or artificial gas the combination of a chamber for receiving the gas, a compressor having inlet and exhaust vent pipes, a communicating pipe between the exhaust of the pump and said gas receiving chamber, a natural gas delivery pipe for the pump and for the engine, means operable under high gas pressure to close the pump inlet and exhaust vent, said means being operable to open position for permitting said pump to idle when the gas supply pressure to the engine reaches a predetermined low pressure, and means automatically operable to entirely close the pump to the natural gas supply when said natural gas supply is at a predetermined low amount.

In testimony whereof I affix my signature.

EDWARD J. GARNIER.