Novel Accumulator Storage Tank

Southern Counties Gas Company Engineers Design a Unique Gas Accumulator at Azusa, Cal., at the End of a 35-Mile Transmission Main for a High Pressure Natural Gas Distribution System

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TO meet the greatly increased gas consumption in its Azusa-Glendora district of Los Angeles County, which is situated at the extreme end of a long transmission line, the Southern Counties Gas Company has designed and installed an entirely new type of vertical storage tank at the corner of Ceritos and Fifth streets, Azusa, Cal. This holder nestles in a beautiful orange grove, the trees being visible at the lower right portion of the picture. The tall eucalyptus trees partially obstruct the view of the new equipment.

Azusa, Cal., where the holder is located, is but a few miles from the famous Mt. Baldy, eternally covered with snow.

Gas was turned into the new tank on Jan. 22 last, and since that date the device has been an essential part of the equipment for distributing natural gas in both Azusa and Glendora, and its value was thoroughly proved during the cold weather recently experienced in Southern California, when it maintained perfect service during this period of unusually heavy demand.

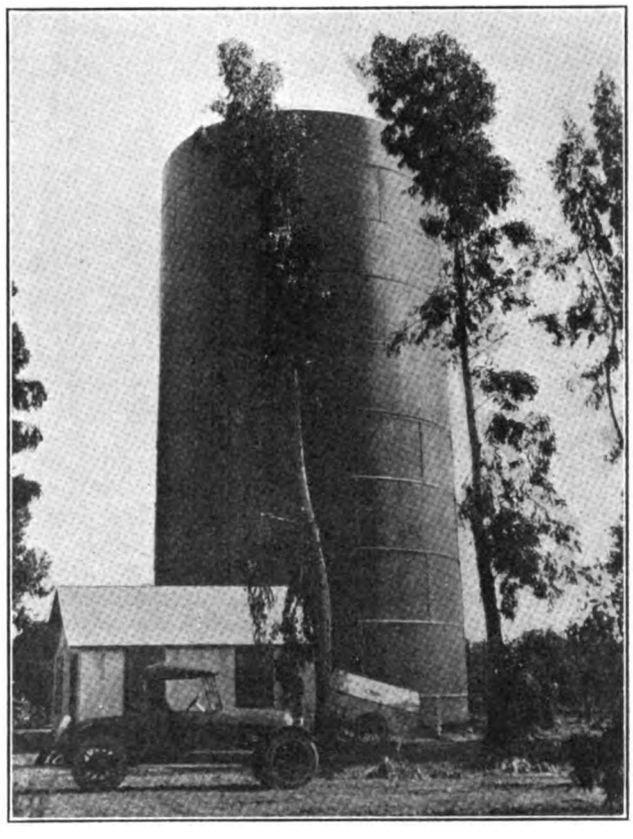
The function of the new holder, which has a capacity of over 100,000 cu. ft., or one day's supply in ordinary weather, is to fill itself with gas from the transmission line during the "off peak" periods, i. e. the early afternoon and from ten o'clock at night until six o'clock the next morning, and to deliver gas into the distributing system during the hours of heavy demand. This is done entirely automatically, and the services of an operator and compressing machinery are not required, as would be the case if the low-pressure type of storage holder were employed.

This new type of high-pressure storage tank was developed for use in connection with high-pressure distribution of gas by two engineers of the Southern Counties Gas Company, M. R. Thompson and A. F. Bridge, and applications have been filed for basic patents. It is believed that this type of holder will solve many of the problems which confront gas engineers in connection with serving communities some distance from the source of supply.

Distribution Demand

In this specific case the storage tank is at the extreme end of a 35-mile transmission line, starting in the Placentia Oil Fields, Orange County. This pipe line extends to Brea, a distance of 7½ miles, then 14 miles farther to Pomona and thence 13 miles to Azusa. Although there is boosting equipment at the Pomona plant, the actual source of gas used in Azusa is 35 miles distant. Gas from this line, which is only one of many operated by this company, also supplies Glendora, Covina, Pomona, Claremont, Ontario, San Dimas, La Verne, Upland, Chino and contiguous territory.

In all this territory the periods of heavy consumption are identical, and consequently the demand put upon the transmission line is very heavy during the "peak" periods and light during the "off peak" periods. The new storage tank fills itself with gas when, during these "off peak" periods, the pressure on the extreme end of the line builds up above what is required in the distribution system of Azusa, and stores this gas until, due to heavy demand during "peak" periods, the pressure on the transmission line drops to that required in the distributing system. The tank then automatically discharges the stored gas into the mains and prevents a further drop in pressure.



Unusual design of high-pressure gas holder

Tank Dimensions and Operation

The Azusa storage tank is 35 ft. in diameter, 72 ft. high and has a capacity of 107,000 cu. ft. at 31 lb. when filled. The storage tank has no moving parts and consists simply of an air-tight chamber 35 ft. high and a superimposed water tank which is open at the top. The lower or gas chamber is initially filled with water, and, when gas is admitted to this chamber from the transmission line, the water is displaced and forced through connecting pipes to the water tank above. When the water is completely displaced, the lower chamber is filled with gas, where it is stored under pressure equal to the static head of water. The reverse operation occurs when the stored gas is withdrawn. Ordinary pressure regulators are employed on the inlet and outlet to shut

off the supply when the holder is full and to govern the outlet pressure.

The high pressure carried in the gas chamber necessitates rather heavy construction, but by an ingeniously designed system of stay bolts the weight of metal has been cut down to a surprisingly low figure, and, on account of the simplicity of the structure, the construction cost is less than that of a low-pressure holder of equal capacity.

Advantages

Among the advantages of this type of storage tank claimed by the designers are the following:

1. Smaller amount of ground space occupied.
2. Lower initial cost.
3. Lower maintenance cost, due to the absence of moving parts and to the smaller surface area to be kept painted.
4. No power-driven compressors or boosting machinery required to deliver stored gas to the mains, consequently no noise or dirt.
5. No operator or attention of any kind required, except to occasionally add a little water to make up for evaporation.
6. No operating cost whatever.
7. Rate of hourly delivery only limited by capacity of gas mains, while with low-pressure type delivery is limited by the capacity of the boosting machinery.
8. Appearance is less objectionable, first, because of small size and symmetrical shape, similar to the standpipes often used in connection with domestic water supply systems; and, second, because the outside service is always clean and dry and may be painted any desired color.

All these advantages combine to make the structure less objectionable when maintained in restricted districts. This is a very important factor, as many weak points in existing distributing systems are in districts where the unsightly low-pressure holder, with its necessary accompaniment of noisy boosting machinery, would not be tolerated.

The distribution of gas at high pressure is becoming more and more popular, and the general adoption of this new type of storage tank would seem almost certain wherever low-pressure conditions at peak periods are to be expected at the ends of high-pressure transmission or distributing lines.

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the price of gas itself, or to approve the fixing of the price by any judicial process, or by Legislatures in the manner condemned in these cases.

"If the gas companies had lost this case, there would have been an end of the ability of the public utilities to serve the people. The money markets would have been closed to those seeking capital which could be ordered to serve the public at a loss. The court says: The public has no such right in respect of private property, although dedicated to public use. There is no novelty in that. The doctrine is as ancient as sound. The rights of all in the service of public utilities are superior to the rights of any to prices unduly low. It is the function of the courts to intervene with the rule of reason whenever the regulators stray from it by fixing prices unreasonably high or low. The worst way of fixing prices is by statutes. The fact that Legislatures have established commissions shows that they appreciate their own unfitness for this function. But there are many cases in which Legislatures have sought to overrule the commissions.

The gas price originally was fixed carefully and correctly, but the statute was not changed when conditions changed. The same fault is charged against the commission by the court. For a year the commission had had authority to alter the legislative price, but failed to do so. The court therefore annuls all that has been done and declines to take over the functions peculiarly proper to the commission. The price of gas may be expected to be reduced when it ought to be, and as it would have been without a procedure which has been wrong and foolish."
