

(6) Know that funds are available or a specific appropriation made by the proper authorities to pay you before proceeding with your contract work.

(7) Have your contract in writing and know that it is worded properly.

(8) Have and put everything in writing and act only upon the strict wording of all contracts.

(9) In state work ascertain first if there is a state board or court of claims; if not you must depend on the official honesty and integrity of the official with whom you deal. Remember personal honesty and official honesty are contradictions in some officials.

(10) Never consider or do any public work without first consulting competent legal advice.

While the above advice for the contractor will give him some knowledge of his position in a road contract, yet it does not protect him from the many abuses now possible under such contracts. Those must be corrected by honest, conscientious officials who will countenance only the same character of engineers. Contracts and general specification conditions for road work must be drawn solely for that class of work and not copied slavishly from ancient documents used for buildings, etc. There must be no discrepancy between the contract clauses and the general conditions or other parts of the specifications. Unit prices for unit quantities of specified work with full details in the plans and specifications or cost plus percentage contracts for definite work with opportunities for honest, competitive bidding and awards to lowest bidders are essential. All unnecessary "satisfaction," "discretion," "warranty," "final and conclusive decision," "waiver of damages," "waiver of claims," "waiver of right of action," etc., clauses and other similar oppressive or "club" clauses for the official and engineer must be eliminated. They certainly are anything but a sanction for the expectation of good faith . . . in the mutual dealings of men of average right-mindedness. Lastly, and most important, the agreement between the parties must be made a real contract by giving the contractor the power to assert and prove his claims before a competent court or board.

It is probable that next year a commencement will be made with the construction of the railway bridge between Rugen and the mainland, which will be the longest in the world, exceeding even that over the Hohangho, with its 3,580 yards. The cost of this great engineering work is not expected to amount to more than \$5,000,000, or less than a third of that on the Forth bridge. When the bridge, which, it is said, is to include a track for pedestrians, though none for road traffic, is completed it will substantially shorten the journeys between Berlin and Hamburg on the one hand, and Stockholm and Christiania on the other.

The value of the mineral production of Queensland for 1912, according to the annual report of the Minister for Mines, was £4,175,355, including coal. The increase over the preceding year was £514,292, due to the stimulating influence of high prices for metals, together with a noticeable advance in the yield of copper, tin and other minerals. The value of the gold yield for the year was £1,477,979, less than that of copper, and a decrease from 1911. Mount Morgan continues to be the leading mine. Of the copper mines, the Cloncurry is the foremost producer, making a contribution of 10,435 tons. The total copper production was 23,120 tons. While prospecting for tin was active, there were no new discoveries of importance made during the year. The tin-ore production was 3,230 tons, valued at £364,503. The silver production was 569,181 oz. Lead, tungsten, manganese, bismuth, molybdenite, opal and other gems were also produced.

## A NEW PROCESS OF CLEANING PRODUCER GAS.

IN 1902 Mr. H. F. Smith, Mem. Am. Soc. M.E., instituted a series of investigations to determine the nature of the mechanical impurities present in producer gas from bituminous coal with a view to devising more effective methods for their removal. These investigations have since been continued and have resulted in the development of a commercial apparatus involving some new and interesting principles which are described in the following article, recently presented as a paper to the American Society of Mechanical Engineers, and appearing in the Journal of the Society:

The tar and other mechanical impurities present in raw bituminous producer gas are in an extreme state of subdivision. The number of particles present is so great and the quantity of gas to be handled in commercial plants so large that the problem presents more than ordinary difficulties. The effectiveness of the ordinary types of mechanical gas washers and purifiers leaves much to be desired. The primary object has accordingly been to produce equipment that will be capable of yielding gas of a higher degree of cleanness than obtainable by ordinary

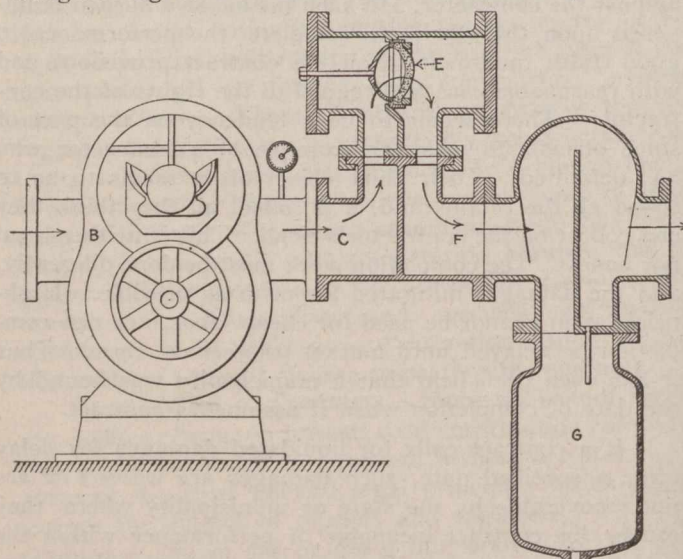


Fig. 1.—Static Scrubber Layout.

methods. The apparatus in its present stage of development can be readily understood from Fig. 1.

The raw producer gas, on leaving the producer, is first cooled to a point where the tar vapors are condensed by being passed through a primary cooler or condenser. From this the gas is carried into an ordinary rotary gas pump B which delivers the gas under pressure into the main C; it is then delivered through a porous diaphragm E and discharged from there into the main F. A sump or separator G is provided in which the tar accumulates.

The structure of the diaphragm E is a matter of considerable importance for the successful carrying out of this process and the materials used seem to have an important bearing on the operation of the equipment. The diaphragm must be sufficiently porous to permit the gas and tar to pass freely, otherwise it will soon become blocked with deposits from the gas and fail to operate. Many materials may be used for this purpose, but at present spun glass is preferred. The glass fibres are not only entirely unaltered by chemical action but seem to possess the necessary physical properties for the successful carrying on of this process. The spun glass in the form of ordinary glass wool (which should be carefully distinguish-