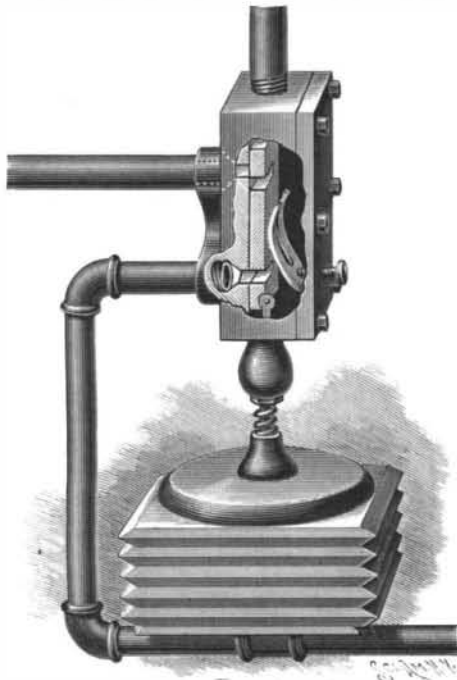


**A NOVEL FLUID PRESSURE REGULATOR.**

The improved fluid pressure regulator represented by our engraving and recently patented by Jenkin Williams and Joseph R. Rees, of Pueblo, Col., is provided with a chest connected at its top by a pipe with a main for leading gas, steam or other fluid into the chest. In the chest is formed a valve seat from which two ports lead to a service pipe and an escape pipe respectively. On the valve seat a slidable valve is mounted,

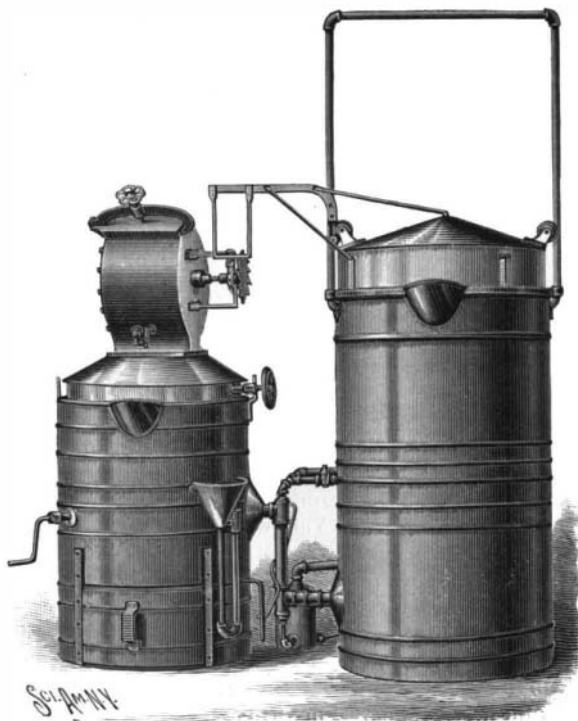


**WILLIAMS' AND REES' FLUID PRESSURE REGULATOR.**

pressed tightly against the seat by a spring, the tension of which may be regulated by a screw. The valve is provided with two ports so arranged that when the lower port is in register with the service pipe, the upper port is disconnected with the escape pipe, and vice versa. The service pipe has an upwardly extending branch, opening into a bellows, which in turn press against a rod surrounded by an expansive spring and extending through a stuffing box into the chest, there to connect with the sliding valve. When the fluid enters the chest, it passes through the service pipe, thence to be distributed to the devices on which it is to be used. The fluid also passes through the branch pipe into the bellows, expanding them so as to hold the valve in the open position shown in our cut. When the pressure in the main increases abnormally, then the pressure in the service pipe causes the bellows to expand still further, thus moving the valve upward, cutting off the fluid from the service pipe and bringing the port of the escape pipe into register with its valve port. A sufficient quantity of gas having by this means escaped, the bellows collapse correspondingly, the valve slides down, thereby closing the escape pipe port and opening the service pipe again. Should the service pipe break, the bellows collapse completely, the valve descends and the fluid is cut off from the service pipe, thus preventing its waste. An effective arrangement is therefore provided for automatically shutting off the supply of gas or water to a building in case of fire.

**AN AUTOMATIC ACETYLENE GAS GENERATOR.**

Artificial illumination produced by means of acetylene gas is found to possess more of the qualities of daylight than other artificial lights, not excepting even



**AN AUTOMATIC ACETYLENE GAS GENERATOR.**

arc light. The recent invention of the electric method of making calcium carbide permits of the production of acetylene gas by a very simple process at a cost which allows of its general application.

The important feature in the use of acetylene is to secure a simple generator for making the gas continuously with safety and economy.

Our engravings represent an acetylene gas generator of this description. It is known as the "Ordway," and is manufactured by the National Acetylene Gas Generator Company, of Corning, N. Y., and St. Paul, Minnesota.

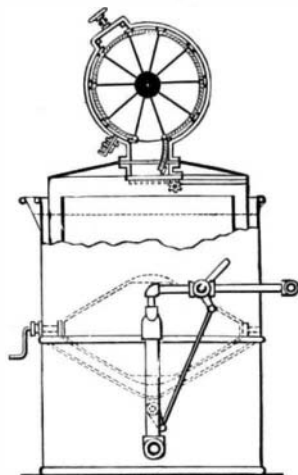
The apparatus consists primarily of an automatic feed generator and a gasometer. The automatic feed device, which is placed above the water tank, has a casing containing a magazine, which is cylindrical in form and divided into ten or more radiating compartments. The compartments are filled with calcium carbide from the top of the inclosing case, each compartment being then closed by a hinged and latched cover. A trip placed on the side of the inclosing case engages each latch as it passes by, and causes the cover of the compartment to open. The calcium carbide drops into the water below, where it is decomposed without heating the apparatus, the heat being absorbed by the water. This gas bubbles through the water, rises to the top of the generator and passes through pipes to the adjacent receiver, where it is again discharged into water, removing the impurities. The gas fills the gasometer, causing it to rise, and is then conducted from the gasometer by a distributing pipe. By this method a fixed quantity of gas is generated each time, and the gasometer is designed with ample capacity to hold this; there is consequently no over-production or waste. The escape or safety pipe is arranged within the gasometer by means of telescoping tubes, forming a water seal.

As the gasometer discharges its gas it slowly descends, and when near the end of its downward course, a pawl carried by an outwardly extending arm engages a ratchet wheel on the shaft of the magazine. The weight of the gasometer acting upon this wheel causes the magazine to rotate, thus closing the empty compartment and bringing the latch of the next compartment cover into contact with the trip, thereby opening the cover and causing the contents of the compartment to fall into the water below. A locking device prevents the feed cylinder from rotating through more than one space at a time, and a detent prevents the backward rotation of the cylinder. The action of this feed mechanism is consequently automatic.

In the lower portion of the generator an agitator mounted upon a shaft is turned by a crank outside the tank. By it the residuum may be loosened from the bottom of the tank and drawn off by a cock connected by rods with the valve of the distributing pipe of the gasometer. By turning a lever the cock and the valve of the distributing pipe are opened simultaneously, thereby equalizing the gas pressure and preventing siphoning. The large gate valve shown at the base of the cylinder is closed when the machine is recharged, thereby cutting off the gas and preventing any escape into the room. A dial register is provided, by which it may be seen at a glance how much carbide there is in the generator at any time.

**Sleep of Plants.**

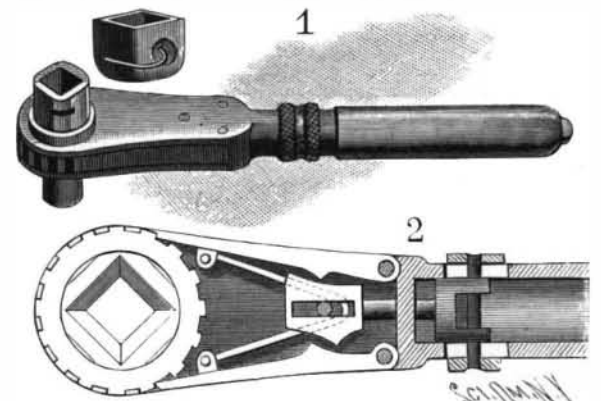
In a large number of plants examined, Herr E. Stahl finds that the nocturnal position of the leaf or leaflets acts as a protection against the deposition of dew, and thus promotes transpiration and increases the amount of nutriment conveyed to the assimilating organs by the ascent of water in the stem. He regards this as its main function rather than, as has been alleged, the prevention of excessive radiation. The nocturnal position of the leaf or leaflets may be classed under two heads: (1) They are directed downward, so that the under side is better protected than the upper side against the deposition of dew (*Biophytum sensitivum*, *Oxalis acetosella*, *Robinia pseudacacia*, *Hedysarum gyrans*, *Impatiens noli-me-tangere*, etc.) (2) They are so placed that the upper side is better protected than the under side against the deposition of dew (*Colutea*



*arborescens*, *Trifolium repens*, *Impatiens glandulifera*, etc.) This difference is usually correlated with a difference in the disposition of the stomates on the two surfaces, as is well seen in the two species of *Impatiens* named; but there are exceptions to this rule. Geotropism probably also plays some part in producing the vertical nocturnal (nyctitropic) position of leaves and leaflets.—*Bot. Zeitung*, 1897, 1te. Abtheil., p. 71.

**A REVERSIBLE RATCHET WRENCH.**

In the improved reversible ratchet wrench shown in our cut, the wrench-socket on which the ratchet wheel is formed or secured is mounted to turn in a casing provided with two plates formed at their rear ends with semi-cylindrical extensions on which a handle screws for holding the parts of the casing securely in position. Referring to the sectional view, it will be seen that fulcrumed, spring-pressed pawls pivoted in the casing



**TYLER'S REVERSIBLE RATCHET WRENCH.**

engage the ratchet wheel at opposite sides, the pawls being provided with inclines which may be engaged by the cam faces of a longitudinally moving cam block. By this arrangement either pawl may be thrown in mesh or out of mesh with the ratchet wheel. The cam-block is provided with a stem extending rearwardly through a clamp provided with lugs projecting over part of the semi-cylindrical extensions, the stem being formed with a head fitted to slide into the same extensions. This head is engaged by a cross-pin passing through slots in the handle casing, to connect with a ring or collar fitted to slide on the semi-cylindrical extensions.

In using the wrench, the ring is pushed forward or rearward, bringing either pawl into operative position as desired and according to the direction in which the workman wishes to use the wrench. An auxiliary socket carrying a spring for engagement with a recess on the wrench-socket enables the wrench to be used for large objects. The invention has been patented by Elias M. Tyler, of Emigrant Gap, Cal.

**AN IMPROVED TIME RECORDER.**

The time recorder illustrated in our engraving, and recently patented by Frederick W. Cook, of San Antonio, Texas, embodies features which are a de-



**COOK'S TIME RECORDER.**

parture from previous devices of this character. The operative mechanism in Mr. Cook's contrivance consists of clock-driven rollers which act directly upon a roll of paper mounted in the casing. The paper is lined longitudinally and is graduated along its edges to represent hours and minutes. The clock-rollers draw the paper over a table at a wide opening in the casing, so as to enable employes to write their names upon the longitudinal lines. A slot in the lid on the left hand side of the opening partially exposes the graduated edge of the paper and enables the employe to see at what time he writes his name. A transfer strip is secured to the under side of the lid and extends transversely into the opening and in a line with the slot. When an employe writes his name, he makes a mark upon the strip which transfers the impression in different colored indelible substance to the paper beneath and indicates the exact time when the name was written. Instead of exposing a single space to accommodate one name written transversely, as in the ordinary time recorders, the apparatus, it will be seen, provides for a number of lines upon which several names may be written longitudinally at approximately the same time. The clock mechanism, by acting di-