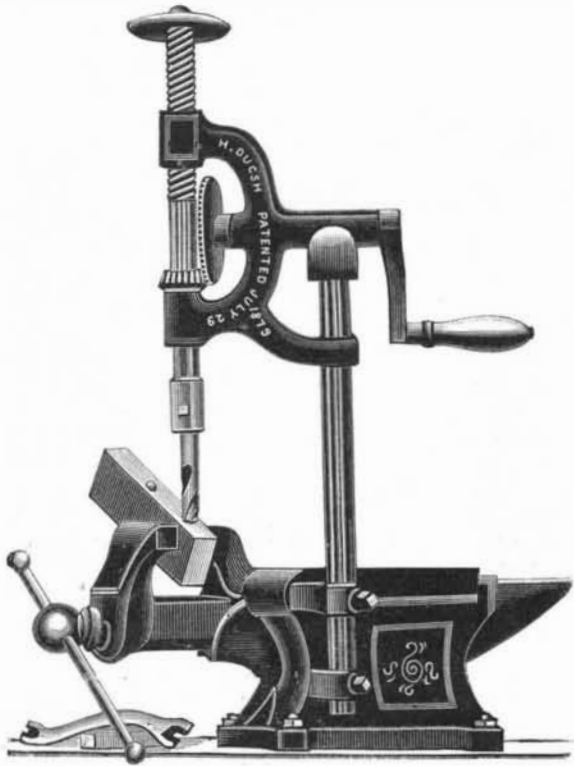


coal thus deprived of the yellow substance, or containing mere traces of it, there is poured anhydrous ether, or, better still, light petroleum oil, which does not dissolve the yellow substance. Those solvents take up the chlorophyll, and yield a deep green liquid, from which the latter can be crystallized out by slow evaporation in the dark."

NEW VISE AND ANVIL DRILL.

We give herewith an engraving of a combination tool of great utility, made by the Miller's Falls Company, of Mil-



VISE AND ANVIL DRILL.

ler's Falls, Mass., and 74 Chambers street, New York city. With this tool the work can be held in the jaws of the vise in any desirable position, and a hole may be drilled either straight or at any required angle. It seems well adapted to the work of machinists and all other mechanics working in metals. It is fastened on a bench like an ordinary vise, as shown in the engraving. The drill press can be removed in an instant when the vise or anvil is wanted separately.

This combination tool is capable of a wide range of application in various kinds of iron and steel hand work. It is well made in all its parts, and only the best materials are used in its construction. The shaft to which the drill press is fastened and the spindle are both made of steel. Each machine is furnished with a chuck capable of holding drills from half an inch down.

A Supposed Unseen Outer Planet.

In a paper communicated lately to *La Nature*, M. Flammarion shows reason for supposing that probably a planet exterior to Neptune has been the determining cause of the orbit of the comet of 1862 (which has been surely determined), and describes its course round the sun, about the distance of the aphelion of this comet, and of the classical stream of meteors of the month of August. (It is known that Leverrier attributed to Uranus the introduction into our system of the stream of November meteors, and supposed the perturbation to have occurred in the year 126 of our era.)

ELECTRICAL PRESSURE INDICATOR.

The annexed engraving represents an improved pressure temperature indicator, designed to serve the very important office of indicating maximum and minimum pressures and temperatures. The importance of this class of inventions must be acknowledged by engineers, superintendents, and others who are required to give daily attention to these matters.

In all operations pertaining to the use of pressure or temperatures, there is generally some considerable range of pressure or temperature not in any way injurious; but extremes of high or low pressure or temperature are to be avoided for obvious reasons. If the pressure is too low, work is delayed and in some cases goods are injured. In either case loss will ensue; while, if the pressure run to the other extreme, it may reach a point where rupture must result. To avoid these extremes, the ordinary instruments indi-

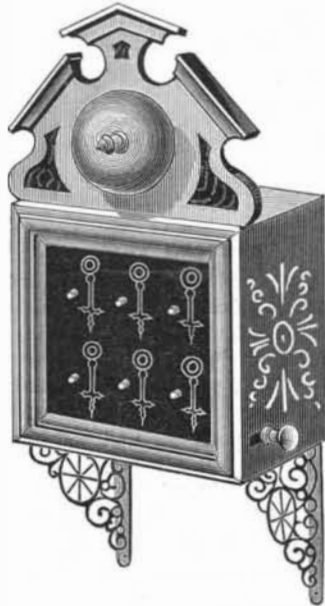
cating the pressures or temperatures are required to be carefully watched by the attendant, a duty that is sure to become wearisome in time, with a possibility of neglect at an important moment. Disaster is too often traceable to inattention of this kind.

The indicator shown in the engraving is a faithful servant, standing sleeplessly on guard day and night, ready to give warning when the extreme of either high or low pressure is approached by ringing a small bell placed in any room however distant, within hearing of the operator, thus enabling the attendant to perform other duties with an assurance that he will receive prompt notice of any considerable variation of pressure or temperature. When the device is to be used for indicating pressure it is attached to any of the ordinary spring pressure gauges, and when used to indicate temperatures it is connected with a pyrometer.

The device shown in Fig. 1 represents an ordinary spring pressure gauge, on the spindle of which is secured a crank arm, A, with a projecting crank pin on its outer end; the glass front of the gauge is bored for the reception of a post that has double washers on the opposite side of the glass to which pins, B and C, are attached. The washers turn upon a central screw in the post, enabling the pins, B and C, to be moved and secured in any desired position around the center of the post. A wire connects the central post with the batteries, passing in the circuit through a switch, D, and bell, E, back to the gauge.

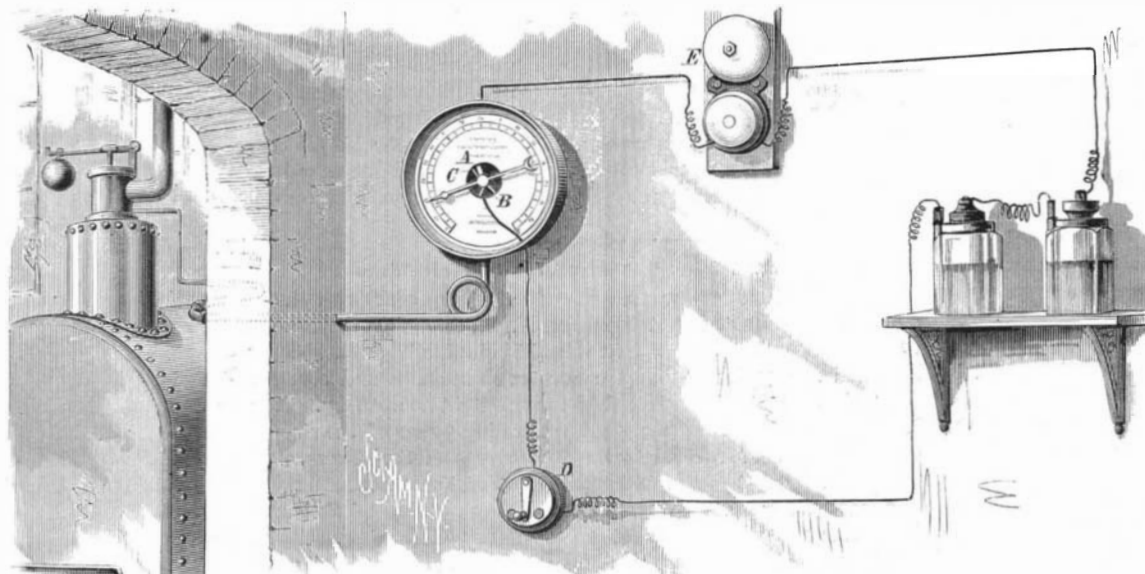
The electrical circuit is completed or broken automatically by the rotation of crank arm, A, which coming into contact with the pin, C, completes the electric circuit, and rings the bell, E. This bell may be placed at any distance from the instrument, and will indicate the minimum pressure. A reverse movement of the spindle brings crank arm, A, into contact with pin, B, indicating the maximum pressure. An alarm at either extreme signifies that the attention of the attendant is now required. The switch, D, is provided to admit of disconnecting the electrical indicator whenever desired. This is found necessary when the device is used in connection with water tanks, reservoirs, etc., to prevent the bell ringing after the proper attention has been given.

In cases where it is desired to connect a number of boilers or tanks to one bell, a device not unlike a hotel annunciator is used (Fig. 2). The bell rings at the proper time, and the needle point shows the location of the boiler that requires attention.



SHAW'S PRESSURE ANNUNCIATOR.

This appliance is adapted to all kinds of spring gauges, and to Shaw's standard mercury gauges. The batteries employed are reliable, requiring only a little water to supply waste of evaporation once in the course of two or three months, and about once a year a few crystals of sal ammoniac are to be added.



SHAW'S ELECTRICAL INDICATOR.

In large works the electric bell may be placed in the office or any part of the building, and will give instant notice if steam is too low to perform work, or so high that it is dangerous. The device seems capable of a great variety of applications, and will undoubtedly prove a watchful, faithful, and inexpensive servant.

For further particulars address the patentee, Mr. Thos. Shaw, at steam gauge warerooms, 915 Ridge Avenue, Philadelphia, Pa.

IMPROVED ELECTRIC LAMP.

We give herewith an engraving of an electric lamp patent-



FARMER'S ELECTRIC LAMP.

ed by the well known electrical inventor, Mr. Moses G. Farmer, of Newport, R. I. A globe made of glass, and having an air-tight stopper fitted to its lower end, contains a small bar of carbon supported by two large blocks of the same material, mounted on the ends of two bars of metal extending downward through the stopper, and provided with binding posts for receiving the wires from an electrical generator. Two small tubes enter the globe through the stopper, for the purpose of substituting for the common air contained in the globe a vacuum or an atmosphere of some suitable gas. The small carbon rod offers great resistance to the passage of the electrical current, and is consequently heated to incandescence, and produces a brilliant light without consuming either itself or the gas contained in the globe.

The Harnessing of Electricity.

Mr. W. H. Barlow, the new president of the Institution of Civil Engineers, London, in his recent inaugural address, speaking of the rapid growth of telegraphy and other practical applications of electricity, said that the diminution of power, from increased length of the conducting wire, had been surmounted by relays of power at fixed stations. (This was the discovery of Morse.) By employing this ingenious expedient on the Indo-European Telegraph, Calcutta had frequently been put in direct communication with London, a distance of 7,000 miles.

He further stated that Dr. C. W. Siemens had ascertained that, including all sources of loss, 50 per cent of the original power could be realized by electric wires at a distance of one mile from the motor; and that with adequate provisions against heating it would be no dearer to transmit electro-motive power to a greater than to a smaller distance. Sir William Armstrong, by means of an electro machine and wire works his circular saw at a distance of a mile from the water wheel that turns the electric machine. By the same means Dr. Werner Siemens works a locomotive that carried thirty persons.

ENGINEERING INVENTIONS.

Mr. James A. Stout, of Belleville, Ill., has patented a traction engine in which the propelling power is applied directly to an adjustable front axle, and the axle is provided with a universal or ball joint motion. The boiler is of novel construction and designed with a view to economy and safety.

An improved rock drill, patented by Mr. John Brown, of Ishpeming, Mich., is so constructed that the piston and tool may be rotated by the entering air or steam, and that the entrance and exit of the air or steam will be controlled by the movements of the piston.

Mr. James E. Purdy, of Tallahassee, Fla., has patented a means for connecting cars, which is so constructed that the cars will couple themselves when run together, and will not be liable to become accidentally uncoupled.

Mr. James Morton, of Philadelphia, Pa., has patented