

**IMPROVED GATE.**

We give an engraving of a new driveway gate, recently patented by Mr. John F. Lukens, of West Mansfield, O. The gate is composed partly of wood and partly of iron rods. It is very light both in weight and appearance, but amply strong. It is capable of being very easily operated from the carriage or by a person on horseback, and at the same time it may be opened and closed in the same manner as a common gate.

The gate opening and closing attachment may be readily applied to any of the ordinary gates now in use at a very slight expense. As shown in the engraving, the improvement consists simply of a crank formed of a wrought iron rod, and put through the upper eye of a common gatehinge. This crank is supported in bearings on the gate post, and the upper end of the rod of which it is formed is bent to form a lever for receiving the wires which connect with the levers, by means of which the gate is opened and closed. A movement of one of the hand levers in one direction turns the crank so as to raise the free end of the gate, when it will swing open of its own gravity. The movement of the lever in the opposite direction produces the reverse effect, and the gate closes.

Further information in regard to this invention may be obtained by addressing the inventor as above.

**Ozone from Oxygen.**

A French chemist, Dessan, has made a discovery in respect to the action of light that is likely to prove very important. He has found that oxygen may be converted into ozone by the action of light rays. In making his experiment, Dessan employed very pure oxygen; it was contained in a glass globe, which, together with the other apparatus, was carefully covered with black paper to prevent the admission of light. In these circumstances the oxygen did not betray the presence of ozone, but, after the rays from a Drummond oxyhydrogen lamp had shone upon the oxygen for twenty-five minutes, ozone was distinctly shown to be present on testing with iodide of starch.

**SPRING STEAM HAMMERS.**

The steam hammer shown in the accompanying cut is the invention of Messrs. George Booth & Co., and is particularly adapted to the rough shaping of iron work in machine shops, and is a useful substitute for the ordinary steam apparatus in the execution of general work of no very great importance. The driving pulley is connected with the shafting by means of a belt, so that the machine is always ready for starting. A gearing, actuated by a flat band of iron running round the base of the anvil, allows of the machine being instantaneously stopped at will. To effect the latter it is only necessary for the workman to cease pressing on this pedal, which is jointed at either side of the frame, and pulled by a spring that constantly tends to produce a stoppage.

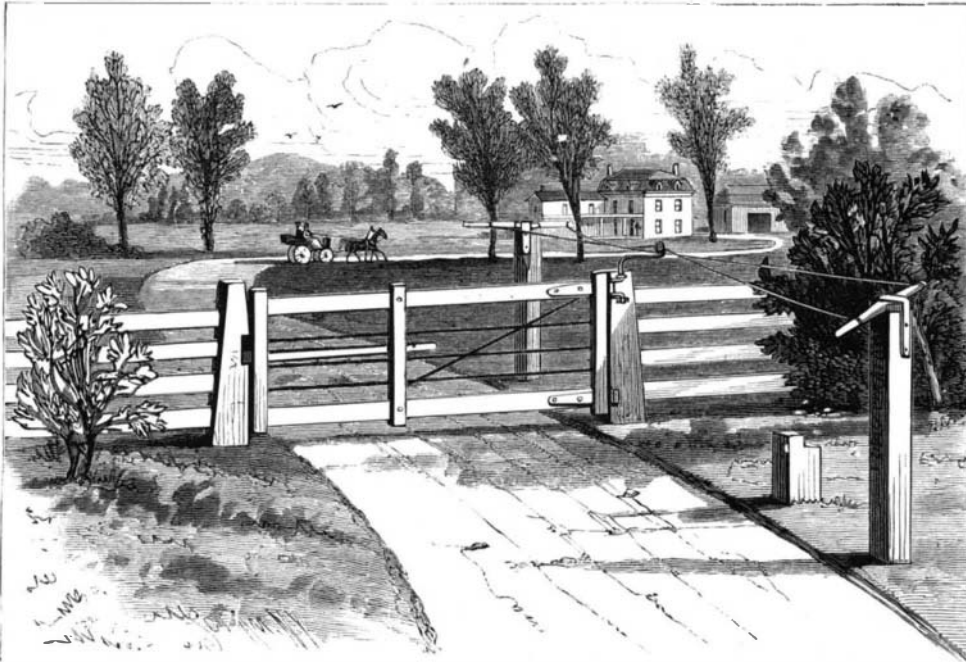
Revolution is transmitted to an eccentric which is connected with a rod that actuates the spring. This latter is constructed like the bearing spring used on some vehicles. At its center it is set into a cap piece which is connected with a regulating mechanism. The latter consists of two lever arms, of which the larger moves over a notched sector. One of the notches is occupied by a catch tappet, whose position varies according to the nature of the work. The connecting rod likewise permits of a preliminary regulation. It is constructed in two parts, which are connected by one nut in common. The threads at the extremities run in opposite directions, so that the effective length of the rod may be varied in order to render the action of the hammer regular.

These ingenious arrangements permit of an exact determination of the force of the blow, from the neutral one up to the maximum impact. During the operation of the machine the hammer rebounds, and thus yields to the spring a certain live force that aids the eccentric to pass the dead center. The net weight of these hammers varies between 775 and 5,500 pounds. The smallest occupy a space of about 1½ by 3 feet, while the most powerful ones require a surface of about 4 by 6½ feet. The general form of the apparatus is elegant, and they possess all the solidity that machines of this kind should have.

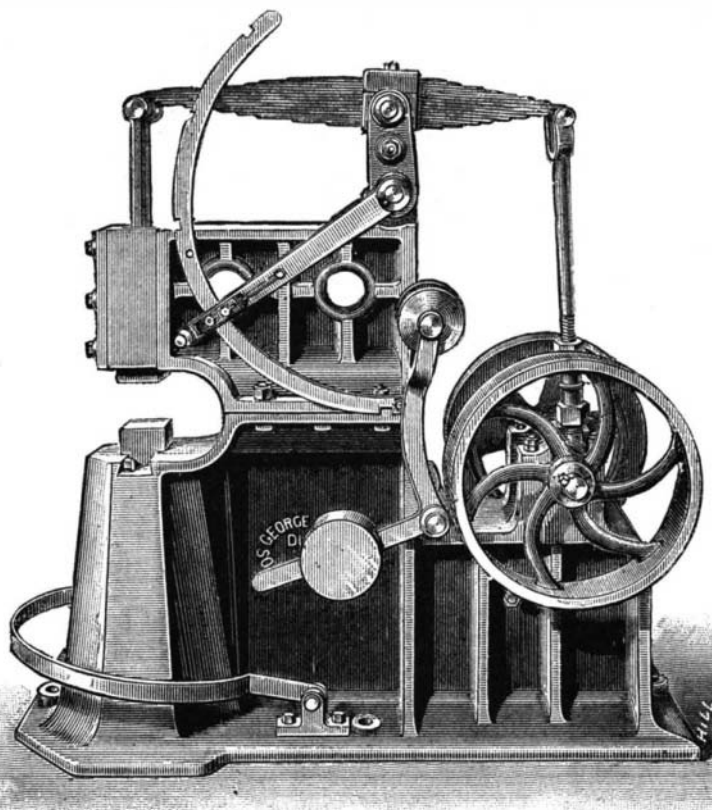
To size chromos or oil prints before varnishing, use a thin solution of fine glue, isinglass, or starch.

**The Duration of Luminous Perception.**

Attempts have repeatedly been made to determine the time which elapses between the appearance of a light before the eye, and the production of a signal by the person on perceiving the light. M. Charpentier has experimented afresh as to this, and with some novel results. The subject of experiment looked into a large blackened case and towards a window. A hole in the further side of the case was closed by a metallic shutter held in position by an electro-magnet, though not touched by it. A person behind the case broke the circuit of the magnet, so that the shutter fell; his act also produced a mark on a rotating cylinder. On seeing the light the person looking into the case pressed a spring with the forefinger of his right hand, and this act

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also, by electrical agency, produced a mark on the cylinder. The interval between these marks, compared with the data of an electric chronograph, afforded a measure of the so-called "duration of luminous perception." It appears that with the same person, and like conditions, this duration varies, without apparent regularity, to the extent of double. But a constant average may be arrived at from say a dozen observations; this, in the author's case, was thirteen hundredths of a second (direct vision). With different persons it varied from nine to fifteen hundredths. It is notably increased by other brain occupation—*e. g.*, speaking or attentive listening during the experiment. It is always greater in indirect than in direct vision, and greater the further the point of the retina struck from the center. This difference between the

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two kinds of vision is considerably reduced by many days' practice, but is never entirely suppressed. Practice also considerably shortens the duration of the reaction for different points of the retina. The exercise of an eccentric point affects the different points of the same retinal hemisphere, abridging the duration, but not those of the other hemisphere. Further, this shortening influence of exercise of a point in the inner half of the left retina extended to the outer half of the right retina, while the inner half of the latter retina reacted much more slowly than the same exercised part of the left eye.

**An English Pleasure Yacht.**

A Bell-Coleman refrigerating machine has just been fitted on board an iron screw steam yacht known as the Sea Queen, the owner of which, says *Engineering*, is Mr. James Galbraith, of Wemyss Bay, a gentleman who has long been prominently identified with the management of several well known lines of colonial steamers and sailing vessels. The yacht itself was built in the year 1880, by Mr. Robert Duncan, Port-Glasgow, and supplied with compound engines by Messrs. Rankin & Blackmore. Measuring 210 feet from figurehead to taffrail, by 25 feet in breadth, and 16 feet in depth (moulded); built under special survey of Lloyd's, and classed in Lloyd's Register; having a tonnage capacity of 565 tons, according to the Thames Y. M.; and provided

with engines capable of indicating upward of 500 horse power in regular work—the Sea Queen is certainly one of the largest, most powerful, and handsomest pleasure yachts afloat.

When handed over to the owner, her fittings, accommodation, navigating appliances, etc., were exceedingly complete; but Mr. Galbraith by and by came to see that, to make his magnificent yacht perfect, so that long voyages in warm climates, extending to days or even weeks on end, might be thoroughly enjoyed, the addition of a mechanical refrigerating machine was desirable. Placed in the after portion of the engine room, the refrigerator is supplied with steam from the main boiler, and is designed so that it can be worked with steam at 80 lb. pressure (which is that used for the ship's engines when at sea) or with steam down to 20 lb. pressure, as when the vessel is in port with the fires "banked." Roughly speaking, the machine occupies a space of about 54 cubic feet, the measurements being about 9 feet by 2 feet by 3 feet. The air compressor cylinder is 8 inches in

diameter with 8 inch stroke. At the trial of the machine it was worked at from 60 to 220 revolutions per minute, and at 150 revolutions per minute it provided 3,000 cubic feet of dry air per hour, the temperature of which was considerably below zero. The meat chamber, which has been designedly kept small, has a capacity of 80 cubic feet, so that the machinery need only work part of each day. After the machine at the trial had been working only a few hours the temperature of the air in the meat chamber came down to 8° Fabr. It will thus be seen that the machine is capable of freezing water for table use and of refrigerating meat and other perishable provisions in such a manner that a supply quite sufficient for a three months' cruise may be taken on board before starting. Incidentally we may mention that this really very fine yacht is furnished with a steam launch, with steam steering gear by Bow & McLachlan, with steam capstan by Muir & Caldwell, steam gear for hoisting the mainsail, steam pipes to all the baths, steam heating apparatus in the pantry, etc. On trial her engines indicated 630 horse power, and her speed was 13 knots.

**Ebonizing.**

How to make woods, such as cherry, mahogany, etc., look like ebony, is often desirable, and a correspondent of the *Hub* gives the following directions:

To imitate black ebony, first wet the wood with a solution of logwood and copperas, boiled together, and laid on hot. For this purpose 2 ounces of logwood chips, with 1½ ounces of copperas, to a quart of water, will be required.

When the work has become dry, wet the surface again with a mixture of vinegar and steel filings. This mixture may be made by dissolving 2 ounces of steel filings in one-half pint of vinegar.

When the work has become dry again, sandpaper down until quite smooth. Then oil and fill in with powdered drop-black mixed in the filler.

Work to be ebonized should be smooth and free from holes, etc. The work may receive a light coat of quick-drying varnish, and then be rubbed with finely pulverized pumicestone and linseed oil until very smooth.

**A SALT BED 115 FEET THICK.**—There was completed, July 23, at Marine City, Michigan, a well which passed through 115 feet of solid crystal salt. Salt was encountered first at a depth of 1,633 feet, and from that point to the depth of 1,748 feet the material removed was pure salt.

The universal square may be used as a try-square, T-square as a graduated rule, for laying out a miter, and for finding the center of a circle.