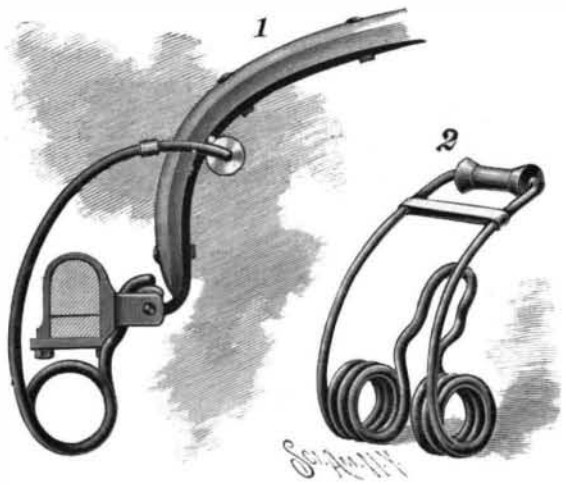
AN ANTI-RATTLING THILL COUPLING.

The attachment for thill couplings or thill irons represented in the illustration is made principally of a single piece of spring wire, and is readily applied to any axle and any thill. The device exerts sufficient pressure on the eye of the thill iron to prevent rattling, and has a rolling tension on the forward face of the thill iron by which the shafts and thills will be balanced when the horse is attached, and which is designed to hold the thills upright or nearly so when the animal is disengaged therefrom. The improvement has been patented by Thomas Price, Itasca, Texas. Fig. 1 shows the application of the device, Fig. 2 representing it detached. The side members, curved forwardly and upwardly from the coils, support a friction roller shaped to receive the forward face of the thill iron, the spring or tension of the wire practically clamping the friction roller, and the ends of the wires being bent inwardly to form a journal for the roller. The



PRICE'S THILL SUPPORT.

tongue projecting upward between the coils is adapted to be carried up between the eye of the thill iron and the ears of the clip, where its concave under face rests on a cushion, preferably of leather, which rests upon and extends partially around the upper or rear face of the eye of the thill iron. The concavity of the tongue near its lower end is adapted for engagement with the axle or with the ends of the clip plate, the coils being beneath the axle. The device, as will be seen, is very simple, and may be quickly and easily applied.

IMPROVED GAS AND GASOLINE ENGINE.

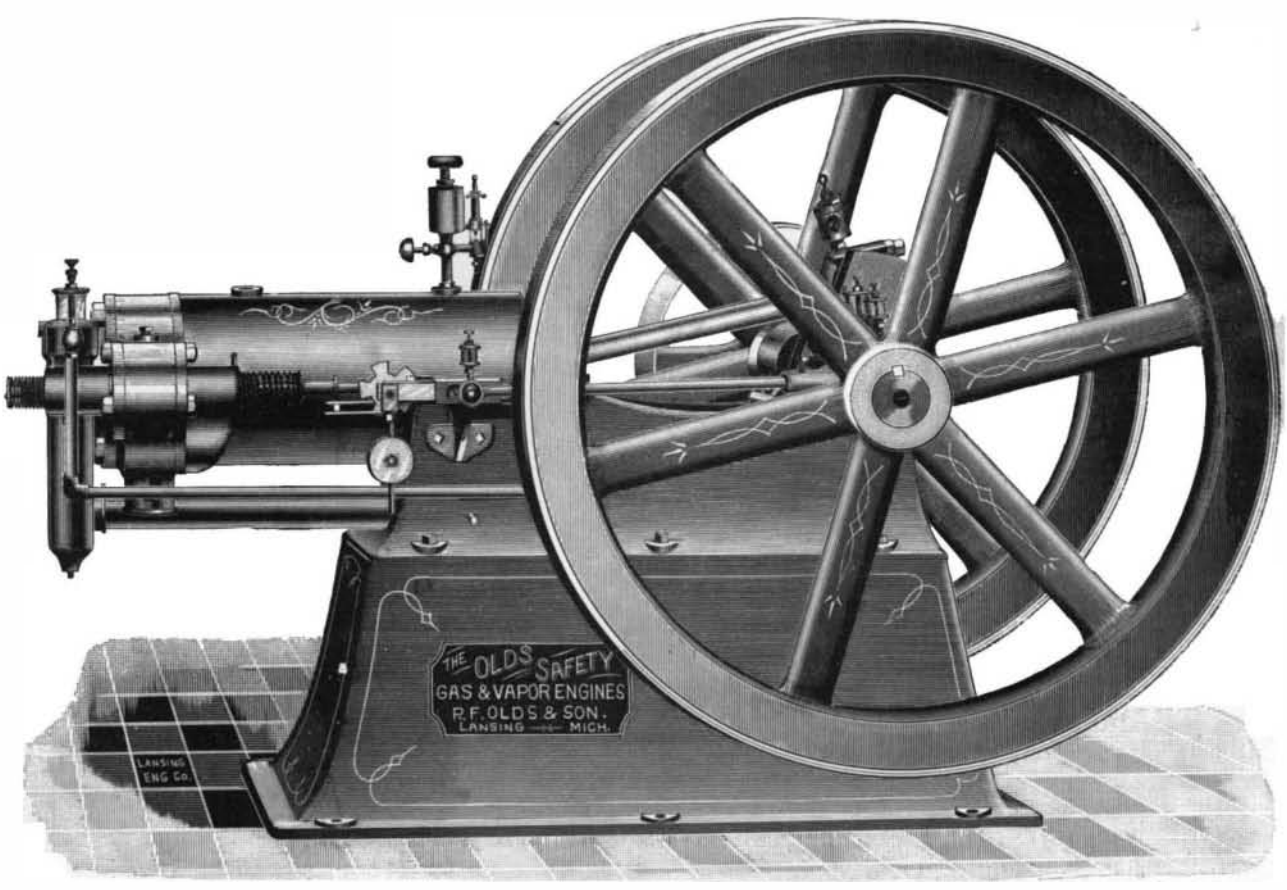
The development of the gas engine since the Centennial Exhibition of 1876 is not less remarkable than the development of the steam engine in its earlier days. Improvements in gas and gasoline engines have succeeded each other with great rapidity, until this type of motor seemsto have almost reached perfection.

We give an engraving of an engine of recent design made by P. F. Olds & Son, of Lansing, Mich., which is refined in both principle and construction. While the makers of this engine have adopted the four-cycle system, which has proved itself the most economical system of operation for gas engines, they have avoided all the complication of mechanism heretofore thought necessary for securing the valve motions, and have devised a new and very simple movement that accomplishes all that can be done by cams, lateral shafts and gearing, besides insuring the prompt opening and closing of the valves. This motion is secured by a plain eccentric on the main shaft, which reciprocates the alternating wheel operating the exhaust and compression valve. By throwing out the pawl which operates the alternating wheel, compression will be omitted and the engine can be turned to any point without the resistance of compression.

When gasoline is used as a source of power, the liquid is supplied to the engine from a tank located outside the building containing the engine, or, in case of small engines, the tank is located in the engine base, and by a simple device the gasoline is supplied to the engine as needed. Any surplus flows back to the tank.

The engine is arranged to use either an electric or hot tube igniter, the latter being constructed on an improved principle. Everything connected with the engine is arranged with a view to perfect safety. A very sensitive governor is employed which maintains a close regulation. The engine is nicely balanced, has large valve openings, ample bearings, straight line connections, and embodies all the improvements suggested by years of use of gas engines of various kinds, besides containing new features peculiar to itself.

The engine is made in two forms, horizontal and vertical, and is adapted to launches, which are also built by this firm.



IMPROVED GAS AND GASOLINE ENGINE.

Earthed Center Main.

In connection with possible dangers from the use of pressures of from 400 to 500 volts on the mains of electrical supply companies, I beg to hand you the following opinion from Mr. Musgrave Heaphy, who has recently discussed this matter with me. I need scarcely state that an opinion from this gentleman, who has such unrivaled advantages for estimating the dangers of electric power distribution, is worth serious attention.

It is commonly assumed in a three-wire system of supply, with center wire earthed, that it is impossible for there to be a difference of pressure on any premises wired on one side of the system greater than that between one of the outers and the middle wire. Mr. Heaphy points out that the full pressure may be brought into one house under certain conditions.

Assume two adjacent houses, the one connected to the positive and middle wire and the other to the middle wire and the negative; and let there be in the party wall: (a) an iron door frame, wall box or piece of shafting, etc., communicating between the two houses, insulated by dryness of the wall, by dry woodwork, or other means securing practical insulation. Or (b), leakage of water on to a portion of the party wall thus insulated.

Assume accidental connection between one of the outer mains, say through a defective flexible wire to one of the insulated pieces of metal, or to the damp portion of the wall. The leakage to earth will be probably too small to blow the fuses and so to disconnect the house.

Next assume an accidental leak on the other pole of the system in the adjacent house, say through the metal case of a switch or lampholder.

It is clear that, if the piece of insulated iron or damp wall be touched at the same time as the defective fitting, a shock due to the full pressure will be felt.

These conditions are not likely to occur often, for two earths on opposite poles have to be made concurrently and in adjacent houses, yet the risk is increased by the consumer's difficulty of detecting either leak except by a shock.

An obvious safeguard is to earth all isolated pieces of metal, but this does not get over the risk from walls which are damp locally. Iron barrel or concentric wiring, with the outer earthed, appear to be the safest methods of wiring under the conditions assumed. For with either it is probable that a single leak would blow one of the fuses, and thus call attention to the defect.

In fact, if the middle wire be earthed, all iron work in buildings should be effectively earthed also.—Albion T. Snell, in the Electrical Review.

TENSION DEVICE FOR CHECK ROW WIRES.

A device to facilitate the stretching of check row wires at a uniform tension, no matter how often the wire may be shifted, or whether it is carried longitudinally of or across the field, is represented in the accompanying illustration. It has been patented by George B. Austin, of Dundas, Minn. It consists of a tension hook, the hook end of which is in twin form, that the wire to be stretched may be passed between its members, if desired, in making the attachment, and on the flat shank of the hook is a scale in inches, at the outer end of which an elongated guide yoke is secured to the shank. A spring is coiled around the

AUSTIN'S CHECK ROW DEVICE.

shank, one of its ends being secured thereto near the hook, while the wire of the spring at the opposite end is carried through a loose yoke and parallel with the scale, being also passed out and back through the fixed yoke, an eye being formed in the wire beyond the shank of the hook, and its inner end being secured to the loose yoke. The stake to which the guide wire of the check rower is usually attached is made to receive the eye of the device, one end of the wire to be stretched being attached to the hook, and when the wire is placed under tension the loose yoke moves over the scale and indicates in inches the amount of slack in the wire taken up, enabling the operator, when the wire is to be again stretched, to take up the same amount, whereby the wire will always be kept under the same tension, insuring the rows being in proper alignment.

Boron Battery.

The Electrical Engineer of November 29 describes this new Austrian battery, which consists of a plate of zinc and one of carbon covered with boron, the electrolyte being a solution of "manganese salt and other substances;" the voltage is 2·5 to 3, which is maintained for quite a long time; the cost of maintaining the battery is said to be one penny for a 10 hour run — but for what output is not stated. The novelty consists in covering the carbon plates with boron, which is done by immersing them at a high temperature in a bath of chloride or fluoride of boron, then in a solution of oxalate of platinum, after which they are heated to a red heat in an atmosphere of hydrogen. A plate so treated contains metallic boron in its pores.

A NEW industry in London is that of preserving eggs. The eggs have the shells removed, the white and yolk are then mixed together and the whole packed in hermetically sealed tins.