A New Petroleum Engine.

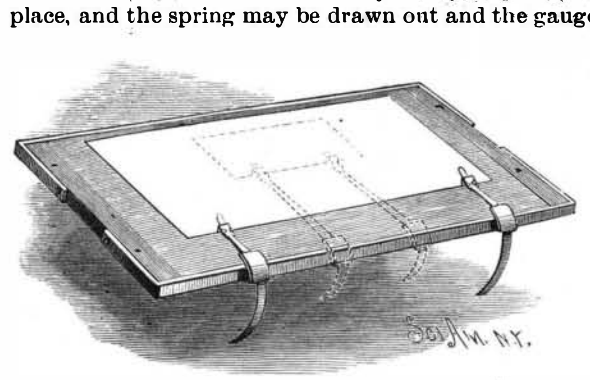
To produce a small engine that can be operated by the combustion of petroleum is a problem that has received the attention of quite a number of our best inventors. That there is a great demand for small power machines there is no question; and the almost unlimited supply of petroleum, and the low price it is sold for, induce the seeker for a cheap, small power to turn his thoughts in the direction of petroleum for the fuel.

The English newspapers make mention of a new petroleum engine just brought out, which they claim has less objectionable features than most other petroleum engines which have been tried.

The trial experiments were made at Messrs. Priestman Brothers, Holderness Foundry, at Hull, England. The petroleum is stored in a small tank containing one to two days' supply, as the case may be. A small pressure of air is put into this tank and the petroleum is forced out of it into a vessel in a vaporized condition, in which it is then drawn into the cylinder by the outstroke of the piston; and having been compressed on the instroke, the charge is ignited by means of a small electric spark. This immediately explodes the contents in the cylinder, and the piston is driven forward. The engine in which the highly refined petroleum is used is very similar to that in which the common petroleum is employed, the only difference being that in the latter engine the oil is taken into the cylinder in a heated condition. The cost of the oil is estimated at a halfpenny to three farthings per indicated horse power per hour. Four horizontal engines were at work, two with benzoline and two with common petroleum. One of about three and a half indicated horse power, supplied with benzoline, was driving easily four blasts at which chainmakers were at work, besides a punching and a shearing machine. A vertical engine of about four horse power was driving a tram car and doing work with ease. The tests were considered by the invited engineers and reporters present to have been most satisfactory.

GAUGE ATTACHMENT FOR PRINTING PRESSES.

The platen of the press is provided with the usual clamping bars, which are pivoted to its side edges and are swung down over the edges to hold the sheets of paper placed upon the platen. One end of a curved spring is turned at right angles and formed with two sharp points that engage with the tympan sheets. Through a slot in the turned edge projects a tongue, connected to the end of the spring by clips, and which serves to retain the sheets of paper and cards, and prevent their slipping over the gauge. The spring slides adjustably through a slot in a plate bent to such a curvature as to hold the spring in the slot to any desired adjustment. This plate is furnished with a blade so arranged as to pass between the edge of the platen and one of the clamp bars, and thereby hold the plate and its spring in position. The spring, the normal shape of which is curved, lies flat against the tympan sheets, with the points in the sheets just where the edge of the card or blank sheet is designed to come. To change the position of these points, the spring is simply slipped through the slot in the plate. Two positions of the points are indicated by the full and dotted lines of the engraving. The spring lies perfectly flat against the tympan sheet, this result being obtained by making the spring tapered at the end forming the gauge. The free ends of the springs curve under the platen and are out of the way. In this gauge there are no prongs to stick through the tympan sheet and cardboard, and thereby spoil the sheets and injure the surface of the cardboard. It is very easily adjusted in place, and the spring may be drawn out and the gauge



BYINGTON'S GAUGE ATTACHMENT FOR PRINTING PRESSES.

placed exactly where the sheet is to be held. The gauge can be instantly changed to any extent.

This invention has been patented by Mr. F. F. Byington, whose address is care of Pacific Press, Oakland, Cal.

IN dead subjects of yellow fever, the heat has been known to run up as high as 113° F. three hours after death, when it was only 104° as life passed from the body. The rise of temperature is supposed to be due to a fermentation of the blood.

The beneficial results of quinine in breaking up malarial and other fevers are supposed to be principally due to the power the drug has to arrest fermentation and putrefaction. Quinine is an anti-ferment. Malarial fever is supposed to be due to the presence of fermenting spores in the blood.

THE CYCLOID.

T. O'CONOR SLOANE, PH.D.

One of the laws of descending or falling bodies is illustrated in the cut. An easy method of drawing the curve of quickest descent, the "brachystochrone," or cycloid, is shown. A circle is cut out of stiff pasteboard or wood. It should be two feet in diameter at least. A batten is nailed or secured to the floor, or the surbase of a room may be utilized instead.

THE CYCLOID.

If the circle is rolled along a straight line, any point on its circumference will describe a cycloid. To trace the curve, a pencil is fixed as near the periphery of the circle as possible. A piece of paper is pinned to the floor, as shown, and the board placed with the pencil at its point of tangency with the batten. Now, on rolling the board along the batten, taking care that a true rolling motion is produced, the pencil will describe a cycloid. Only half need be traced; the full curve is not wanted. Care must be taken that the board does not slip or slide on the strip, or the curve will not be a true one.

This gives the pattern; a piece of wood about three-quarters of an inch thick must be cut to this shape. The wood is best glued up from several pieces, and may then be made quite light and narrow, top and bottom being equidistant, the one forming the half-cycloid drawn, and the other a parallel curve, about two inches coming between them. A foot is arranged to support the end corresponding to the initial position of the pencil, at a height from the ground equal to the diameter of the generating circle. Strips of light wood or of paper are fastened along the sides, to form a groove.

In connection with this curve, a straight piece of wood of length adapted to form its chord should be supplied. This must also be grooved. It is not shown in the cut.

If a marble is released from the top of the cycloid, it will roll down in less time than if it followed any other curve or line extending from the point of starting to the end. The straight piece may be arranged to occupy the position of a chord to the cycloid, and held there. If two marbles are simultaneously released, one from the top of the cycloid, the other from the top of its chord, the one following the curve will always reach the bottom first. The steep descent of the first portion of the curve gives such a start to the marble that it distances its competitor always. One curious feature is that the marble traveling the quickest from point to point does not follow the shortest line—the straight one, or chord of the cycloid.

Other curves may be tried with the same result. The cycloid is always the quickest road. Not only is it this. It also has the curious property that from whatever point a marble is started, all will reach the foot at the same time. This illustration is, if anything, more effective than the other. A marble is released from the top simultaneously with one from any intermediate point. Just as the first one reaches the end, the other one will strike it. It is quite immaterial what points are selected. The same period is always required for the transit to the foot. This property of isochronism makes it the proper curve for a pendulum. In practice, as it would involve a certain amount of complication, it is not used in clocks. For accurate ones, a pendulum swinging through a very small arc of a circle is used. This does not differ enough from a true cycloid to cause any practical difficulty in securing a good time regulation.

The Invention of the Sextant.

Dr. J. L. Dreyer points out, in the *Astronomische Nachrichten*, No. 2,739, an historical error which has crept into several astronomical works, although it was refuted some fifty years ago by Prof. Rigaud in a series of papers communicated to the *Nautical Magazine*. In the books referred to, it is stated that the principle of the construction of the sextant was communicated to John Hadley by his brother, a Captain Hadley, who had in his possession a sextant given to him by Capt. Godfrey, brother of Thomas Godfrey, of Philadelphia, the real inventor of the instrument. But it appears there never was such a Captain Hadley. The brothers of John Hadley were, one a barrister, the other a physician; and he himself was not an instrument maker by profession—as has been asserted—but as an amateur occupied himself with mechanical pursuits, and was the first to bring the polishing of reflecting telescopes to any perfection.

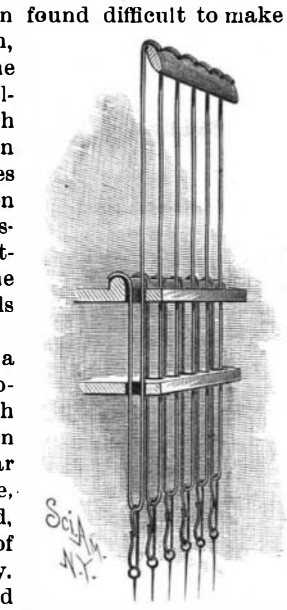
On May 13, 1731, John Hadley communicated to the Royal Society a description of his reflecting octant; and, after some hesitation, Halley declared himself satisfied that Hadley's idea was quite different from that of Newton, who had invented an instrument founded on the same principle. It is no doubt true that Thomas Godfrey, a glazier of Philadelphia, had invented an instrument of this kind about the year 1730; but the first intelligence of his invention did not reach England before the month of May, 1732, in a letter from James Logan to Halley. Godfrey's instrument was made of wood by Emund Woolley, a carpenter, about November, 1730, and had been tried on board the ship Truman, of which John Cox was master. The first model of Hadley's octant had, however, been constructed by his brother George about the middle of the summer of 1730.

Spring vs. Autumn Planting.

From long and extensive experience in planting in different situations and soils, I am in favor of autumn planting of forest trees, and also evergreen shrubs, unless in cold, bleak situations, when the latter are best deferred until spring or early summer. There may be situations where the soil is too wet to admit of early planting, but such is unfit for planting at any season till drained. There is an old saying, which in practice I find to be correct, viz., "Plant a tree in autumn and command it to grow; but in spring you must coax it." Some are of opinion that severe frost will injure early planted trees. This I have proved to be a fallacy. In order to test it, I left young trees with their roots uncovered during severe frost, and planted them when thawed, and I found that they sustained no injury. There is more risk from drought in spring planting than from frost in autumn or winter planting.—*J., in London Garden.*

IMPROVED JACQUARD MACHINE.

In the ordinary Jacquard machines, the devices carrying the harness of the loom consist of iron hooks provided on their lower ends with twisted cords, to which are attached the collets carrying the respective threads of the harness. It has been found difficult to make these cords the same length, so that they would raise the threads of the harness equally. The invention herewith illustrated, which has been lately patented by Mr. James Jackson, of 18 and 20 Albion Street, Paterson, N. J., dispenses entirely with the twisted cords, and attaches the collets carrying the threads directly to the hooks.



Each hook consists of a vertical rod formed at its upper end with a bend, which engages in the well known manner with the cross bar attached to the lifting frame, which raises the hooks and, consequently, the harness of the loom, in the usual way. The lower part of the rod is bent upon itself, and in the bend is hooked a collet formed of spring wire bent and twisted, as shown. Each thread of the harness is provided with the usual loop on its upper end, which is hooked to the collet. The parallel parts of the wires, by passing through apertures in the stationary grates, are guided in their up and down motion in such a manner that the hooks retain their relative positions to each other, having no sidewise or endwise motion whatever. On the lower end of the hook is a bend that passes over a ridge on the upper grate, in the downward movement of the hook. This prevents the hooks from going further down, and they assume the same position they had before being raised. In transferring the threads from one machine to the other, the upper ends are simply unhooked from the collets, or the latter are removed from the hooks.