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A LARGE GAS ENGINE.

It has generally been supposed that gas engines were necessarily limited to 30 horse power and under, and that where larger engines are required they must necessarily be made by compounding smaller ones. Our engraving, however, shows a large gas engine made by H. W. Caldwell & Son Company, Chicago, Ill., and used in the large grain elevator of Taylor Brothers, at Cooper's Point, Camden, N. J.

This engine is rated at 100 horse power. It is operated by carbureted air, consisting of a mixture of common air and gasoline vapor. This provides a fuel which is not only invariable in quality, but is quite inexpensive. In large quantities the gasoline costs six cents per gallon in large cities, and as this engine is operated by one gallon of 74° gravity gasoline per horse in ten hours, it will be seen that the cost of fuel is very light compared with the power yielded. As the engine is working at present it is developing 62 horse power actual. The cylinder has a bore of 16½ inches and the stroke is 24 inches. The crank shaft has a speed of 150 revolutions per minute. The gasoline is drawn directly from a tank considerably lower than the engine, and its vapor is mingled with the air without any special carbureting device. The governor limits the number of charges admitted to the cylinder by controlling an air gate over one of a pair of air tubes shown at the rear of the engine. The air gate has two ports and allows air to be drawn through either tube according to the action of the governor.

In one tube there is a nozzle leading upward from a reservoir containing less than a pint of gasoline, and when the port above this tube is opened, the engine takes in an explosive charge. The charges are ignited by an incandescent tube incased in a larger tube lined with asbestos.

Heretofore, one objection to large gas engines has been the use of tube timers. In this engine they are entirely dispensed with. Another objection to large gas engines has been the difficulty in starting. In some cases, small auxiliary engines have been used for this purpose. All this is obviated in this engine by the use of a novel self-starter, which consists of a hand pump used for forcing the charge into the cylinder and a detonator for exploding the charge after it has been introduced. This device gives the engine its first impulse, after which it continues to operate steadily with its automatic gear.

As this engine requires no fireman or skilled engineer, and as it uses cheap fuel which leaves no residue, it is apparent that this engine has great advantages over the steam engine. The credit of the invention of this engine is due to Mr. James A. Charter, who has long been known in the gas engine business.

Agricultural Experiments in Maine.

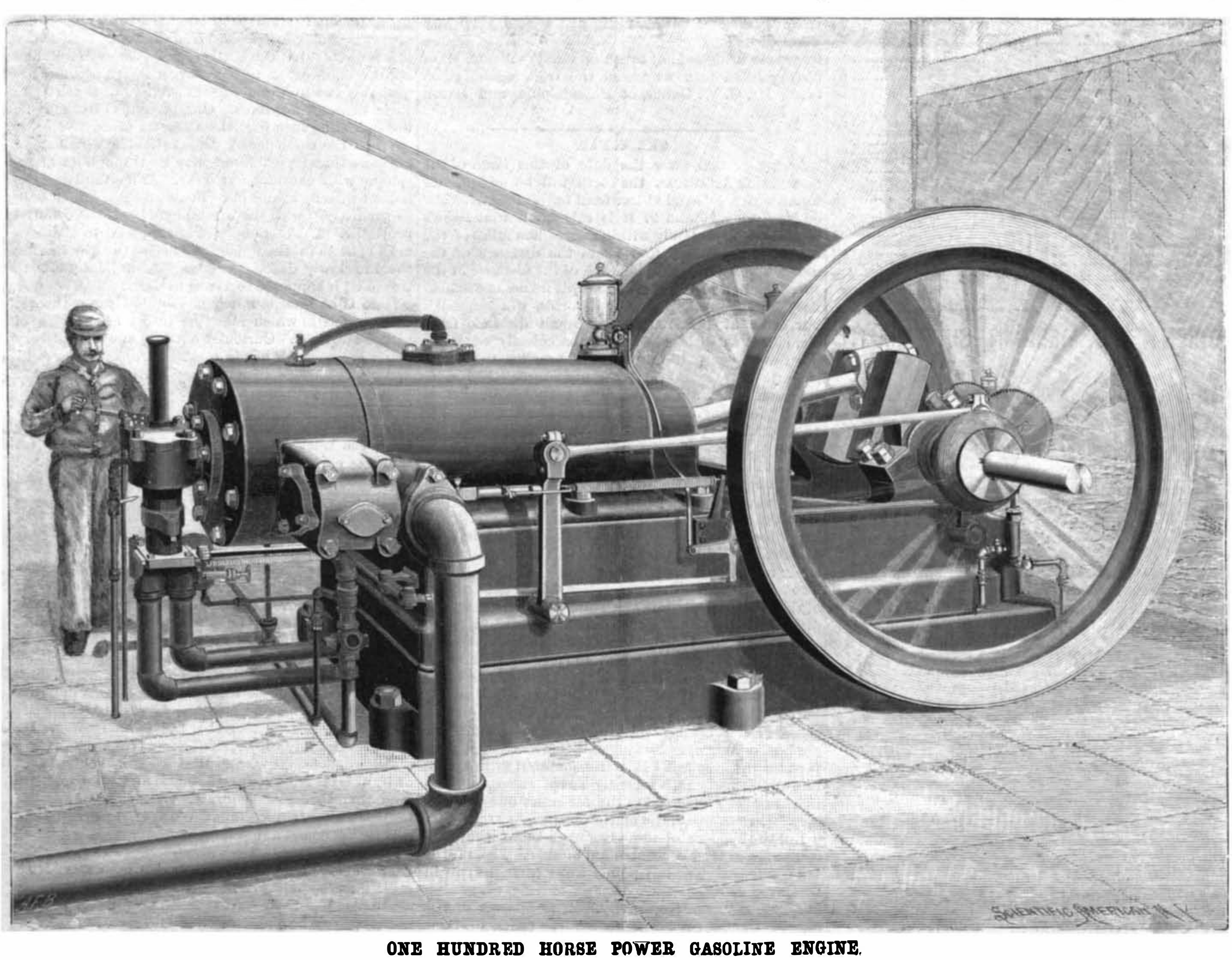
The officers of the Maine State College Agricultural Station deserve commendation for the manner in which they have carried on their researches with a small appropriation. In their report for 1891 some interesting experiments are described, especially those on the digestibility of various foods, such as Hungarian grass, beets, turnips, bran, meal, etc. The animals were confined in separate pens for seven days before the excreta bags were attached and records commenced. Care was taken to prevent waste of the food, which was weighed.

Another series of experiments were made on the effect of different forms and mixtures of fertilizers. Thirty-six one-twentieth acre plots were laid off and numbered. With oats, dissolved bone-black produced, on the average, the largest crop.

The Most Useful Mineral.

If one were to ask his friends what mineral we are most familiar with, and most commonly used for food, the answer would probably be most varied and amusing. Salt would, I fancy, first suggest itself to many, and to those whose training in physiology and hygiene has not been neglected, no doubt the claims of lime and iron and carbon, which, in one form or another, we use with food to build up bones and brawn, would be amply urged. But, after all, it is water, for water is a mineral—a fused mineral. You will find it described as such, along with quartz and topaz and the diamond, in Dana's "Mineralogy," or in other treatises on stones.

We usually think of minerals as solid things, such as metals and rocks and jewels and various chemical salts. But when we consider the matter a little, we see that all these things, if melted by strong heat, are minerals still; only they are now in a fluid instead of a solid state. The difference between these minerals and water is that water gets fluid at a lower temperature that they do, and, like quicksilver, stays melted at ordinary living heat. But in those old ice ages, which, one after another, have swept now over the northern hemisphere, bringing ruin and desolation, the natural and common condition of water was that of a solid—ice—as it largely is to-day out of doors in winter, when not kept fused by the stored-up heat of the soil and rocks, or melted by the sun.—*Mineralogists' Monthly.*



ONE HUNDRED HORSE POWER GASOLINE ENGINE.