

Locusts.

The districts of Matheran and Mahabeshwar, in the Bombay Presidency, according to *The Colonies and India*, have been suffering from an invasion of locusts, huge swarms of which have settled on the trees, which appear to be covered with red foliage and clusters of red flowers during the occupation, but when abandoned are nothing but bundles of bare twigs. While the locusts are on the wing, it is difficult to make any impression on them, although an Italian landowner, resident in Cyprus, has destroyed vast numbers by placing in their path, soon after they are hatched and still unprovided with wings, pits so prepared that, after tumbling in, it was impossible for them to get out. This, however, is only feasible during the wingless stage, when the young locusts march across the country in great columns, more than a mile in breadth.

But the most radical treatment is that of destroying the eggs, which, fortunately, are deposited, not single, but in masses in one place, generally on an uncultivated hill side. The female inserts the eggs by means of a sword-like appendage, and sheds a glutinous matter for their protection; and, as traces of this may be seen glistening on the surface of the soil, it affords an easy clew for the searcher to discover their whereabouts. In Cyprus rewards have been offered and taxes imposed with a view to stimulating the peasantry to destroying the eggs, 62 tons of which were brought in during 1868, representing 50,000,000,000 locusts, the result being that the pest disappeared for several years.

Enormous as is the destruction caused by the locust, there is one advantage about it, viz., that it is edible, in Arabia men and horses using it regularly as an article of diet. By some of the natives they are eaten with oil after being stripped of their legs and wings, but Lady Anne Blunt, in her travels, was in the habit of boiling them and dipping them in salt. Their flavor is described as savoring of a vegetable, not unlike the taste of green wheat.

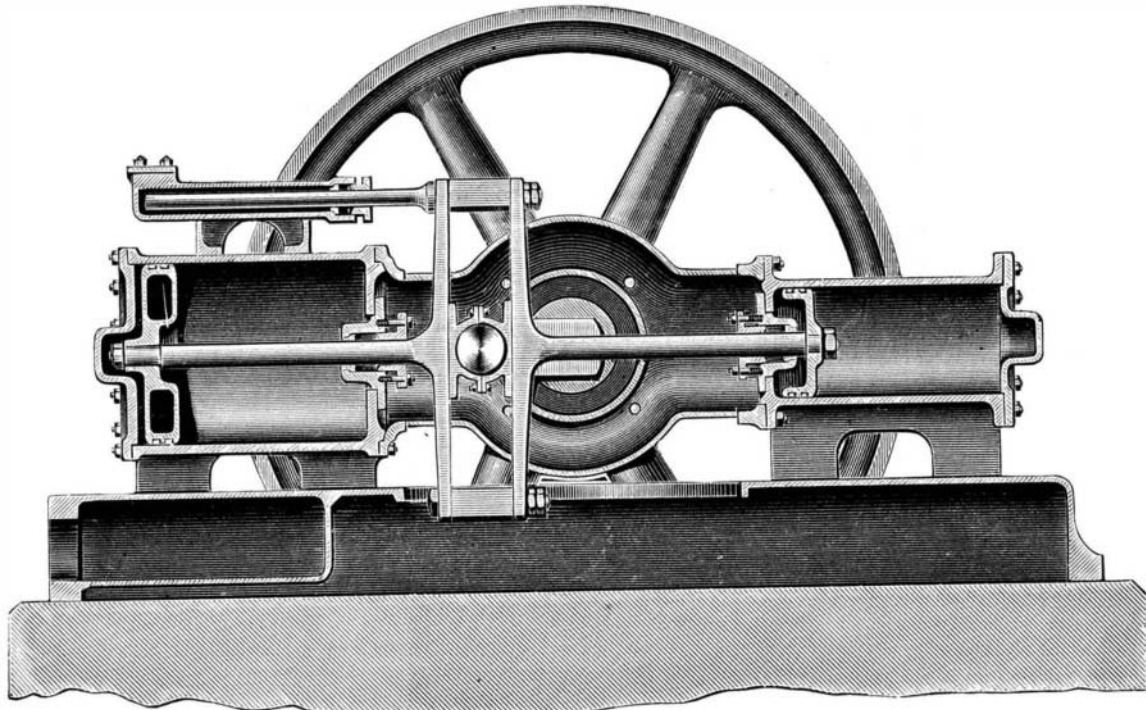
An Interesting Experiment.

In a legal case the point in dispute was whether the water in a brewery well was being polluted by the infiltration of water from a neighboring well about 100 yards distant. The constituents of the waters derived from each well did not differ sufficiently for an opinion to be formed on the point in dispute, simply by comparing the analyses of the two waters, and therefore it was ingeniously suggested, says the *Brewers' Gazette*, that some soluble salt of rare occurrence should be placed in the well suspected of causing the pollution, and then the water in the brewery well should be subsequently tested to see whether traces of this salt had passed from one well to the other. Chloride of lithium was the salt chosen for the experiments, as it is of comparatively rare occurrence, and is very easily detected by the marked crimson color it imparts to a flame, and the minutest trace can be detected by the aid of the spectroscope. Shortly after having placed some of this salt in the well suspected of causing the pollution, the brewery well water gave undoubted indications of lithium being present, and the experiment thus proved that water readily passed from one well to the other, and the dispute was easily settled.

The Grocer, London, predicts that Russian petroleum will gradually prove a formidable rival to American oil in the German market, especially the eastern provinces. Several reservoir cars, it says, have recently arrived at Bromberg direct from Baku, delivering their cargo at a price lower than American petroleum via Bremen, and of the same quality.

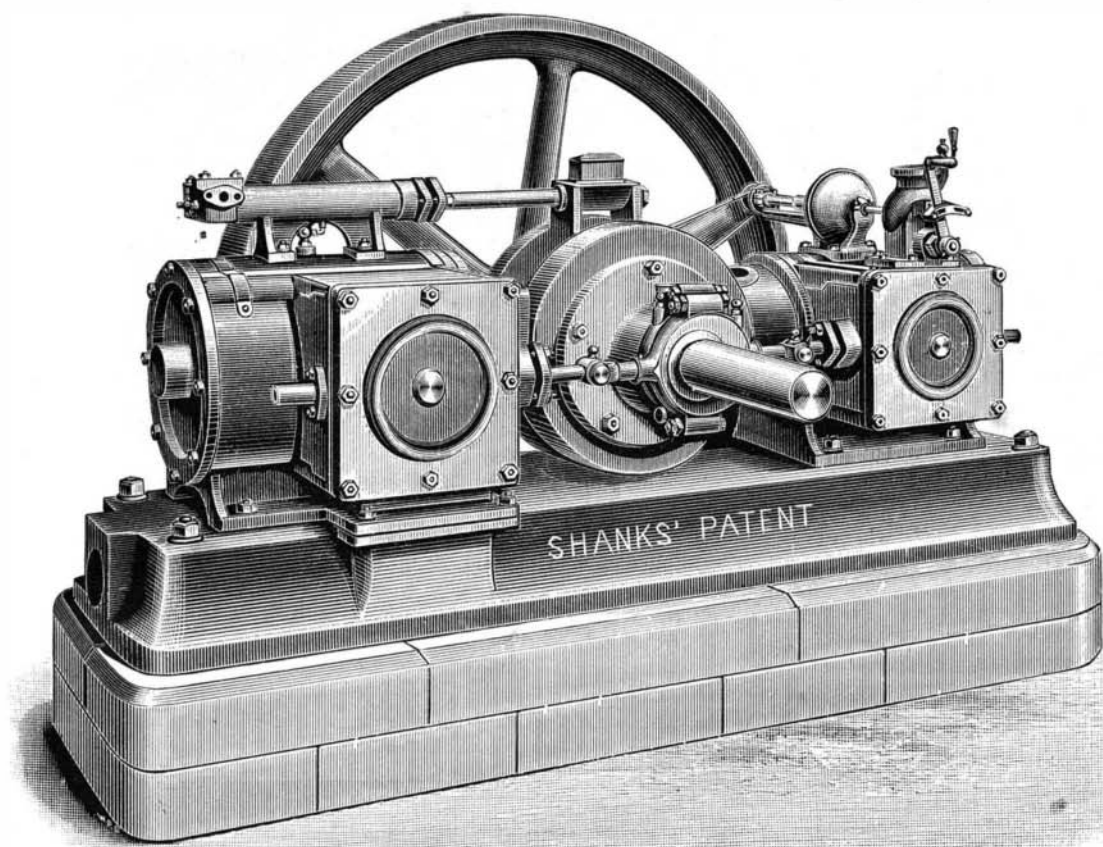
COMPOUND DOUBLE ACTING HORIZONTAL ENGINE.

We illustrate a 12 horse power horizontal engine upon this principle, and which was exhibited by Messrs. Shanks and Son, the builders, at the Engineering and Metal Trades Exhibition, London. In our engravings, Fig. 1 represents a perspective view of the engine, and Fig. 2 a longitudinal section. The chief features of this engine consist in the compactness and rigidity of its design, and the small number of its working parts; while, at the same time, the engine is found to be as complete and effective as the most elaborate type of

**COMPOUND DOUBLE-ACTING STEAM ENGINE.**

compound engine. It will be seen that the two pistons are connected together by a wrought iron crosshead having in its center a vertical slot, into which the crank pin bush is made to slide the same length as the stroke of the pistons, the double stroke completing the revolution of the crank shaft in the usual way. The motion of the pistons is thus communicated direct to the crank shaft without the intervention of the connecting rod, motion bars, slide blocks, etc., usually required for this purpose, and all friction arising from their use is thus avoided.

The arrangement of the working parts is clearly shown at Fig. 2 of our engravings, and by means of this the whole construction will be readily understood. The crank shaft is arranged to admit of power being transmitted from either

**COMPOUND DOUBLE-ACTING STEAM ENGINE.**

side of the engine. These engines require no intermediate receiver, which is indispensable in ordinary engines of this class. The advantage of a continuous expansion is therefore secured without compression or back pressure, and a material increase in the effective power of the engine is the result. The proportions of the cylinders are such as to enable either high or moderate steam pressure to be used with effect. These engines are equally well adapted for agricultural and commercial purposes or for driving dynamo machines for electric lighting, being fitted with Shanks' equilibrium

governor, which is peculiarly sensitive, a quality essential to the satisfactory working of engines used for driving dynamo machines. In some examples of this engine a condenser is attached to the condenser being placed below the engine and forming part of the sole plate.—*Iron.*

Fermentation in Bread.

Chicandard's paper on this subject, referred to in the *SCIENTIFIC AMERICAN*, of August 18, has drawn forth papers from other members of the Academy. V. Marcano publishes similar results (*Comptes Rend.* 96, 1733). He found, however, that the fermentation process depended upon local circumstances; thus he obtained different results in Venezuela, in the tropics, from what he got by repeating his experiments in Paris. He never noticed yeast fungi, but always saw an abundance of moving globular bacteria, and that, in the process of bread making, the gluten and a portion of the albumen was partially dissolved, and converted into peptones that are not precipitated by tannin. Also that "amylase," a secretion of the microbes, was formed. These results agree with those of Chicandard. But while the latter did not observe the dissolving of the starch, Marcano found in his Venezuela experiments that the dough at the beginning of the fermentation contained a mixture of much "erythro" dextrine with but little soluble starch; as soon as it was put

into the bake oven, it contained a perceptible quantity of "achro" dextrine. These substances could be isolated.

Hence bread making is an example of the direct fermentation of starch. In Venezuela, if sugar is mixed with the flour, which makes the dough poor in gluten, it is easy to prove that the bacteria do not attack the starch until the albumen is exhausted. From this it will be seen that there is an actual and direct fermentation of the starch, while it explains the necessity that people there are under of employing ferments that are very strongly developed by Indian corn, potatoes, cane sugar, etc., to get a dough that rises well. In Paris he did not succeed in observing the direct fermentation of starch; it remained perfectly intact.

Moussette then published (*Comptes Rend.* 96, p. 1865) an account of experiments made by him in 1854, when he was assistant to Barral, in condensing the vapors that came out of a bake oven while bread was being baked.

He obtained a liter of liquid from which he was able to distill off 1.6 per cent, by volume, of alcohol, and 0.06 per cent of acetic acid, by weight. Will not some American repeat this experiment?

Naval Power of France and England.

A comparison of the British with the French fleet shows that each contains just thirty-six first class war vessels. In point of thickness of armor and weight of guns, two of the English are superior in offensive power to any on the French list. But in the next seventeen on each list the French are superior to the English, and in the whole list the French are superior in twenty-four, the English only in twelve. Besides this, the English discarded breech-loading cannons in the construction of their fleet, on the ground that muzzle-loaders are easier to manage at sea. The French and the other

Continental powers adopted the breech-loaders, which are capable of swifter and more effective handling. Taking the two navies throughout, it appears that England is far from possessing that pre-eminence on the sea, a contemporary adds, which she did in the days when her "wooden walls" were her glory and her defence. Even Italy and Germany now might challenge comparison with her.

MOSQUITOES are accused by Prof. A. F. A. King of originating and disseminating malarial disease.