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Woods of Australia.

The cedar of Australia is a most valuable wood, and almost the only kind used in joiners' and cabinet work amongst the colonists for the last fifty years; it is said to attain ten feet in diameter. The white beech of the colonists, a species of Vitex, is a noble tree, rising eighty to one hundred and forty feet, whose wood is much prized for the decks of coasting vessels, of fine bright silvery grain, said never to shrink in floors (as do the majority of the colonial woods) after moderate seasoning. A magnificent species of Rhamnus has wood very close and hard, likely to prove ornamental, evidently a serviceable wood. The teak wood of the colony (*Endiandra glauca,*) a noble tree, has wood hard, close, fine, dark color in the duramen, with a powerful aromatic fragrance throughout, is said to be very durable, evidently a valuable timber. The rosewood, a species of *Meliaceæ*, possesses fine timber, durable and ornamental, and possesses an agreeable fragrance, the effect of an essential oil; bedsteads made of it never harbor insects. —[London Building News.

American Nickel and Cobalt.

Near Middletown, Conn., two mines containing the ores of the above-named metals have recently been opened. The metal bearing rock is believed to be of an unlimited depth; the ore is visible in grains throughout the lode, and amounts to about 10 per cent. of each metal. This shows that the lode is exceedingly rich, and when these mines are in full working order their product must have a beneficial effect upon the price of these metals in our markets. Great preparations have been made at the mines for smelting the ore, such as the erection of furnaces, steam engine, stampers, and ore separators.

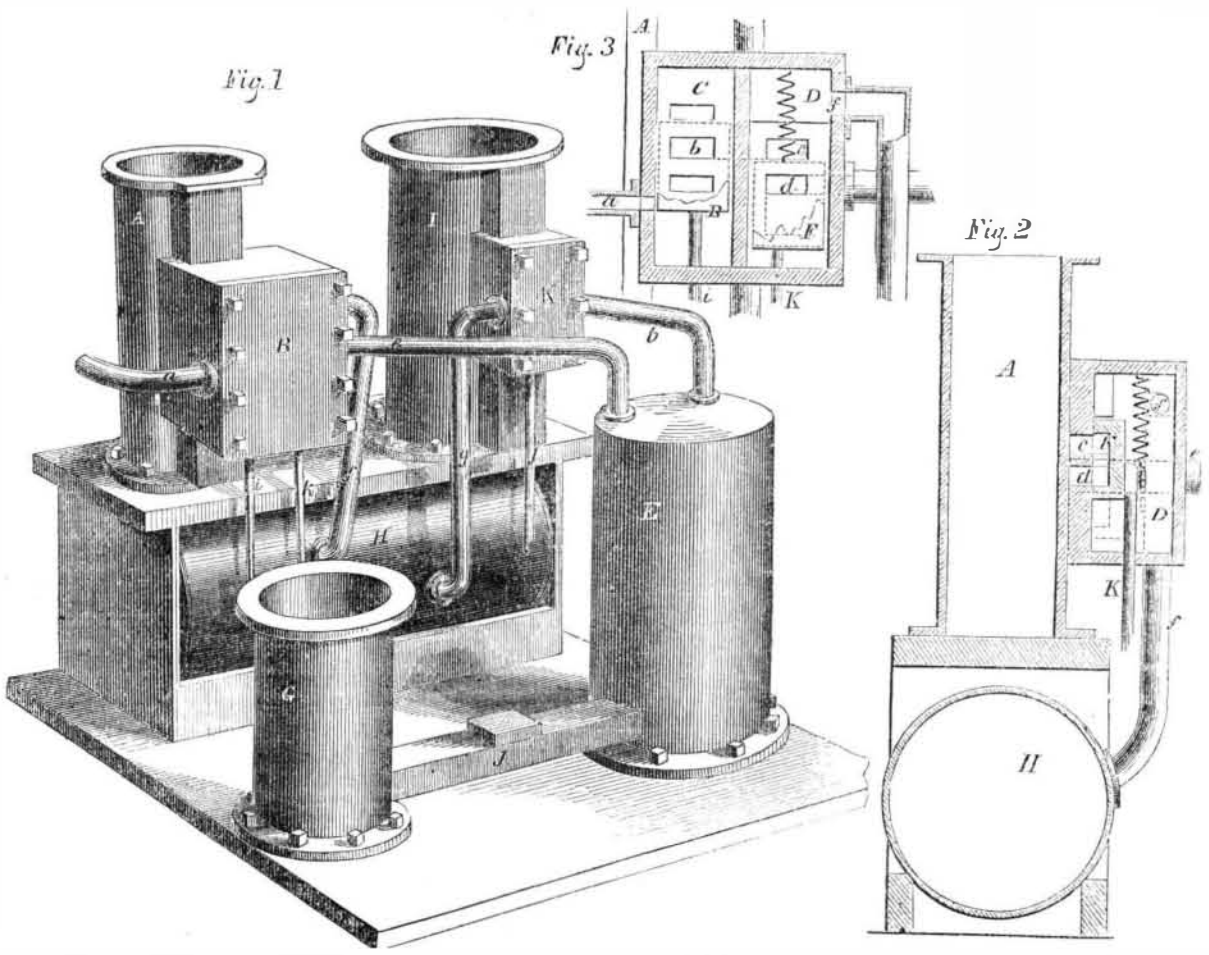
London the Greatest City.

This is now the greatest city in the world, and far surpasses all the great cities of antiquity. According to Gibbon, the population of ancient Rome in the hight of its magnificence was 1,2000,000; Nineveh is estimated to have had 600,000; and Dr. Medhurst supposes that the population of Pekin is about 2,000,000. The population of London, according to recent statistics, amounts to 2,500,000, 414,722 having been added to it during the last ten years. The census shows that it contains 307,722 inhabited, and 16,889 uninhabited houses.

Composition of Gunpowder.

Gunpowder is composed principally of saltpeter about 75 per cent., combined with charcoal about 15 per cent., and of sulphur about 12 per cent. Each of these ingredients, as articles of merchandise and commerce, have advanced in their respective markets, in some instances upwards of 100 and even 150 per cent. Saltpeter principally comes from Bengal and the peninsula of British India. Thesecircumstances have directed the attention of the scientific world towards the application of some other explosive powder or medium, which would be equally efficacious as gunpowder, and less costly. Gun cotton and fulminating silver have been the subject of experiment.

IMPROVEMENTS IN EXPANSIVE STEAM ENGINES.



The accompanying engravings represent improvements in the double-cylinder expansion steam engine, known by the name of "The Woolfe Engine," invented by John J. Johnston, Lawrence, Mass., who has taken measures to secure a patent.

Fig. 1 is a perspective view of the two cylinders, air pump, condenser, and the exhaust steam receiver. Fig. 1 is a side vertical section of the high pressure cylinder and steam receiver; and fig. 3 is a vertical section of the valve box, A, fig. 1.

The object of the invention is to obviate the back pressure of steam on the piston of the high pressure cylinder, and obtain a vacuum on the exhausting side of the piston of the low pressure cylinder, to increase the power of the engine, and effect a saving of fuel. A is the high pressure cylinder having the induction and eduction of the steam effected by a common slide valve, B fig. 3, working in the steam chest, B fig. 1, which receives steam by a pipe, *a*, from the boiler. The eduction port, *b*, of this steam chest communicates by a side passage with a second steam chest, D, figs. 2 and 3, at one side of C; the passage enters the steam chest, D, by a port, *c*. The steam chest, D, contains another port, *d*, from which a passage communicates with a pipe, *e*, leading to the condenser, E.

The ports, *c* and *d*, terminate in the seat of a slidevalve, F, which is capable of such a movement as indicated by two positions (one in dotted lines) in fig. 2, showing a central section of the steam chest, D. From one side of this steam chest, or from any other convenient part of it, outside of valve F, a steam pipe, *f*, leads to the exhaust steam receiver, H—a vessel of about four times greater capacity that the low pressure cylinder engine, I. From this vessel a pipe, *g*, leads to the steam chest, K, of the low pressure cylinder which contains a slide valve and ports; the eduction port or ports communicate by a pipe, *h*, with the condenser. The arrangement of the cylinders and the other part of this engine, and the connections of the pistons are or may be substantially the same as those of any other double cylinder expanding engine. The arrangement represented is supposed to be for a beam engine; the cylinders being placed side by side, and the receiver, H, below them, the air pump, G, being in the same position relatively to the high pressure cylinder as the air pump of a common beam engine is to its cylinder, the condenser being placed beside the air pump and communicating by a passage, J.

The slide valve, B, of the high pressure cylinder, A, and the slide valve of the low pressure cylinder are intended to be operated by any common valve gear connected to them by rods, *i* and *j*. The slide valve, F, is intended to be operated by a cam or other like device on its rod, *k*, in such a manner as to move it very suddenly from the position shown in full to that shown in dotted lines in figs. 2 and 3, which opens the port, *c*, and then releases it, so that the port may be closed to the steam chest, and brought into communion with the port, *d*, either by a spring, *l*, or by the pressure of steam, or the atmosphere. When the movement of the valve, F, to open the port, *c*, takes place, which is always at the instant the eduction of steam from either end of the high pressure cylinder commences, a rush of steam from the high pressure cylinder takes place, through the port, *c*, steam chest, D, and pipe, *f*, to the exhaust steam receiver, H', but this is only of short duration, being stopped by the valve returning to the position shown in full lines, fig. 2, which directs the exhaust steam from cylinder, A, through the port, *d*, and pipe, *e*, to the condenser. The steam escaping from the high pressure cylinder to the receiver, H, expands to a pressure but a little more than that of the atmosphere, and at that pressure acts upon the piston of the low pressure cylinders, whose induction pipe, *g*, is always in communication with the receiver, H.

By the great degree of expansion which is allowed to the steam escaping from the high pressure cylinder by the large size of the receiver H, put little resistance is offered by the escaping steam to the movement of the piston in that cylinder, even while the cylinder is in communication with the receiver, H, which is but for a moment, as its eduction port, *b*, is very quickly closed to the receiver, and opened to the condenser by the upward movement of the valve, F, and in this condition the cylinder remains till the eduction from the other side of the piston commences. The reason for employing the large receiver, H, instead of exhausting directly from the high into the low pressure cylinder, is to relieve the piston of the high pressure cylinder of the back pressure of the exhausting steam, and to obtain a uniform pressure upon the piston of the low pressure cylinder throughout the entire stroke. In order to get the benefit of the vacuum before the piston of the high pressure cylinder during the whole stroke, the slide valve, B, of that cylinder may have a proper degree of lead, and the movement of the valve, F, may take place before the preceding stroke of the piston has terminated, and before the crank has arrived on its center. It will be readily understood by the foregoing description, that the valve, F, will have to make two movements for every one of the valve, B.

By removing the back pressure of the steam, as has been described, it is believed by the inventor that a great economy of power will be obtained. Other valves than those represented may be employed, while the principle of the improvements are preserved.

The slow exhaust, in other words the back pressure of the escaping steam from the high pressure into the expanding cylinder of a Woolfe engine, has always been a difficulty to its successful operation. This defect, it is presumed, is overcome by the improvement described in this engine. This class of engines has received but a partial trial in our country. The modifications and asrangements here illustrated and described may lead to its more extended use.

More information respecting the invention may he obtained by letter addressed to the inventor, at No. 8 Spring street Lawrence Mass.