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## A SEMI-ROTARY ENGINE.

If anybody should ever apply the development theory of creation to steam engines, the apparatus represented in the engraving herewith annexed would doubtless be hailed as the connecting link between rotative and rotary machines. It certainly is a curious hybrid; it is a reciprocating machine, and yet it is not wholly so, nor is it exactly a rotary; perhaps the inventor's name for it, as above stated, is the best, after all, that could be devised. Its construction and operation will be easily understood from the illustrations, which we take from the *Engineer*.

A is the crank shaft, B the crank pin, C the piston, D the valve, E the cam, F the cam wheel, G the valve spindle, and H the supply pipe. The steam is admitted on the face of the piston, through the valve, which, as shown in the side elevation, is worked by the cam, E. The piston then travels in the direction of the arrow, first ahead, then up, down, and back. The governor is so arranged that full boiler pressure is always admitted.

The advantages claimed are (over the ordinary piston engine) reduced cost, it occupies less than half the space, it is governed expansively in an efficient manner, and there are few wearing parts. It is the invention of Mr. Andrew Higginson, of Liverpool, England.

## A New Flooring.

A new system of parquet flooring has recently been introduced in France by M. Buffaut. The squares are composed of slips of wood made in patterns. The pieces are held together by a layer of bituminous cement laid hot on their under side, and this cement is, in turn, covered with a paving tile, so that the three substances are intimately united. Conical pins are driven through holes left in the tiles and into the wood, while the cement is still in a liquid state. The squares are laid in mortar or cement over a layer of sand, and are joined together by very fine iron tongues fitting in grooves. This system is applicable where marble and ordinary pavements are employed, and may be also applied to cabinet work.

## IMPROVED CONTROLLING NOZZLE.

We illustrate herewith an improved nozzle, adapted to fire extinguishing apparatus and for other purposes, whereby the size of the stream, and consequently the volume of water projected, may be easily controlled, or the jet be altogether shut off. There are many advantages attending this arrangement, which will suggest themselves to all conversant with the demerits of the ordinary nozzles. Perhaps the most important advantage (and the one that will especially commend itself to insurance companies) is that the device is calculated to prevent the indiscriminate flooding of warehouses, and the consequent large damage, by water, to buildings and to valuable stock. The reduced stream suffers no diminution of force, and can be thrown as far as, if not farther than, a jet projected from a common plain or ring nozzle. Consequently, in small fires, the quantity of water necessary for their extinguishment can be applied, and any surplus drenching avoided. The controlling mechanism opens and closes the nozzle very uniformly and gradually, so as to avoid the shock due to sudden starts or stoppages of the water. The hose is thus prevented from bursting, while the apparatus is rendered safe for use on hose or hydrants carrying high pressures, and on hose connected to fire engines equipped with relief valves. Greater facility is also afforded in handling hose, by closing down the nozzle and reducing or cutting off the back thrust of the stream.

An exterior and a sectional view of the invention are given in the annexed engravings. The nozzle barrel, A, is screwed into an end piece, B, which has its discharge orifice, C, opening into a valve guard tube, D, in which are air inlet holes, E. A long pointed cone valve, F, placed concentrically with the nozzle, has its stem, G, accurately fitted, but free to move in a small tube, H, which is supported by two thin

city to throw a stream of 1½ inches, 1 inch, and ¾ inch in diameter. These are adapted to all requirements, including those of hotels, warehouses, factories, steamships, etc., up to the largest pumping engines, and are likewise capable of throwing jets as small as ¼ inch.

The inventor, Mr. Melville Clemens, of Worcester, Mass., submits a large number of testimonials from the chiefs of the Fire Departments of New York, Philadelphia, Worcester, Holyoke, Mass., and other cities, pump manufacturers, and others, all of which indicate that the device is both useful and efficient.

Patented March 14, 1876. Patents applied for abroad and in Canada. For further information and circulars, address the manufacturers, the Eaton, Cole, and Burnham Company, 58 John street, New York city.

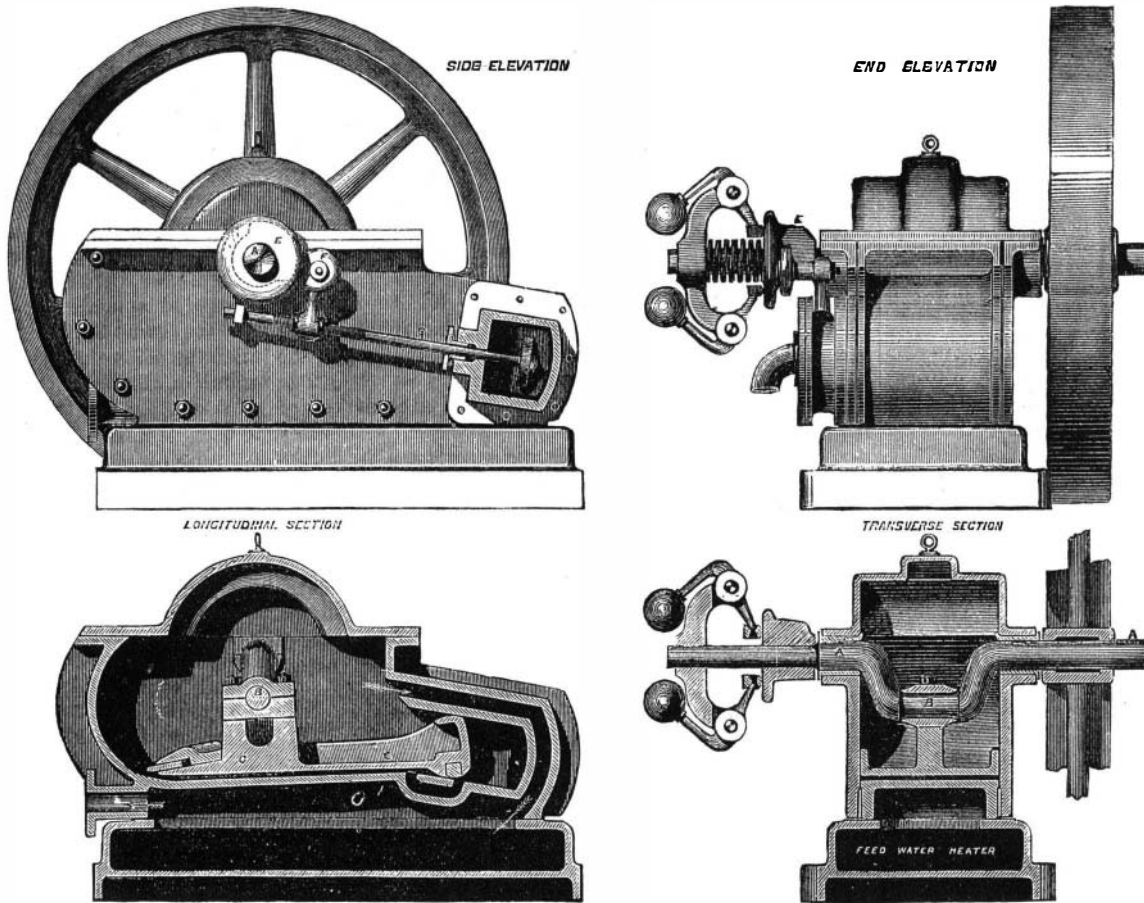
## Cinnamon and Cloves.

The cinnamon of commerce is the inner bark of a tree closely resembling the laurel, or sweet bay, a native originally of Ceylon, but which is now grown in the other parts of the East Indies, and also in Jamaica and other West India islands. The trees are left to grow unmolested until they are nine years old, at which time the young shoots or branches that are about three years old are lopped off. The bark is then slit on one side and removed from the branch, tied up in bundles until the next day, when it is loosened, and the skin or outer bark scraped off. It is then dried or rolled up into quills or pipes, about three feet long, which have a slit down

one side, where the bark was cut. The smallest quills are rolled up inside the larger; the whole then tied up in bundles of 80 or 90 lbs. weight, and wrapped up in cloths, when they are ready for exportation. It has an astringent and highly aromatic and warm flavor, and yields by distillation an extremely fragrant and pungent volatile oil, kept for pharmaceutical use under the name of oil of cinnamon.

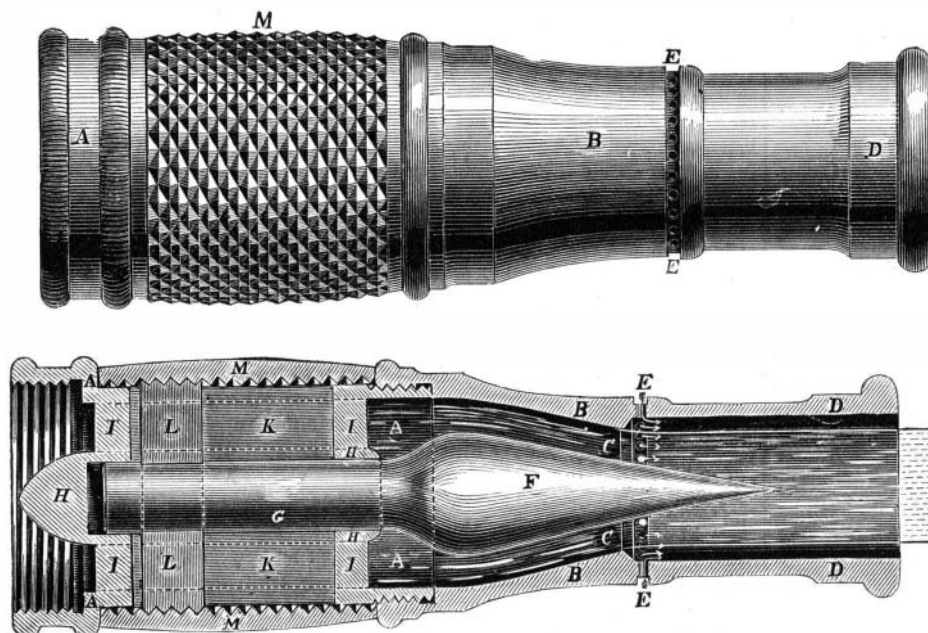
The articles known in commerce as cloves are the unopened flowers of a small evergreen that resembles in appearance the laurel or the bay. It is a native of the Molucca or Spice Islands, but has been carried to all the warmer parts of the world, and is largely cultivated in the tropical regions of America. The flowers are small in size, and grow in large numbers in clusters at the very ends of the branches. The cloves we use are the flowers gathered before they are opened, and while they are still green. After being gathered, they are smoked by a wood fire, and then dried in the sun. Each clove consists of two parts, a round head (which is the four petals or leaves of the flower rolled up, inclosing a number of small stalks or filaments), the other part of the clove being terminated with four points; it is, in fact, the flower cup and the unripe seed vessel. All these parts may be distinctly shown if a few cloves are soaked for a short time in hot water, when the leaves of the flowers soften and readily unroll. The smell of cloves is very strong and aromatic. Their taste is pungent, acrid, and lasting. Both the taste and smell depend on the quality of oil they contain. Sometimes the oil is separated from the cloves before they are sold, and the color and taste in consequence are much weakened by this proceeding.

A SIMPLE way of cutting glass is to crack it with a very fine needle-like gas flame. Start the crack with a file, and then apply the flame, which may be produced through a minute perforation in a glass connected with some rubber piping so as to allow of the flame being conveniently carried from point to point. The crack will run before the flame in any desired direction.



HIGGINSON'S SEMI-ROTARY ENGINE.

feather-edged wings, I, fixed transversely in the barrel. A long narrow slot, K, is formed through the wings and barrel, in which slot traverses a flat bar, L, which is fixed to the valve stem. Said bar has rack teeth on its ends, which engage the screw threads of a milled sleeve, M, which revolves freely on the barrel, A, and which moves the cone valve out and in from its seat at the discharge orifice, to regulate the size of the stream or to shut off the same. The water forms on the cone a solid round jet, which does not fill or touch the tube, D. A spraying attachment (not shown in the engravings) is made by placing in the outer end of the tube, D, a disk perforated with divergent holes, which is secured in place by a suitable cap. When this disk is placed in one position it throws a spray, and when it is turned over it throws a solid stream, in both cases backing the water up



THE CLEMENS CONTROLLING NOZZLE.

in the tube, D, and making a rear spray from the holes, E, which protects the pipeman from smoke and heat. The nozzles are made in three sizes, respectively of capa-