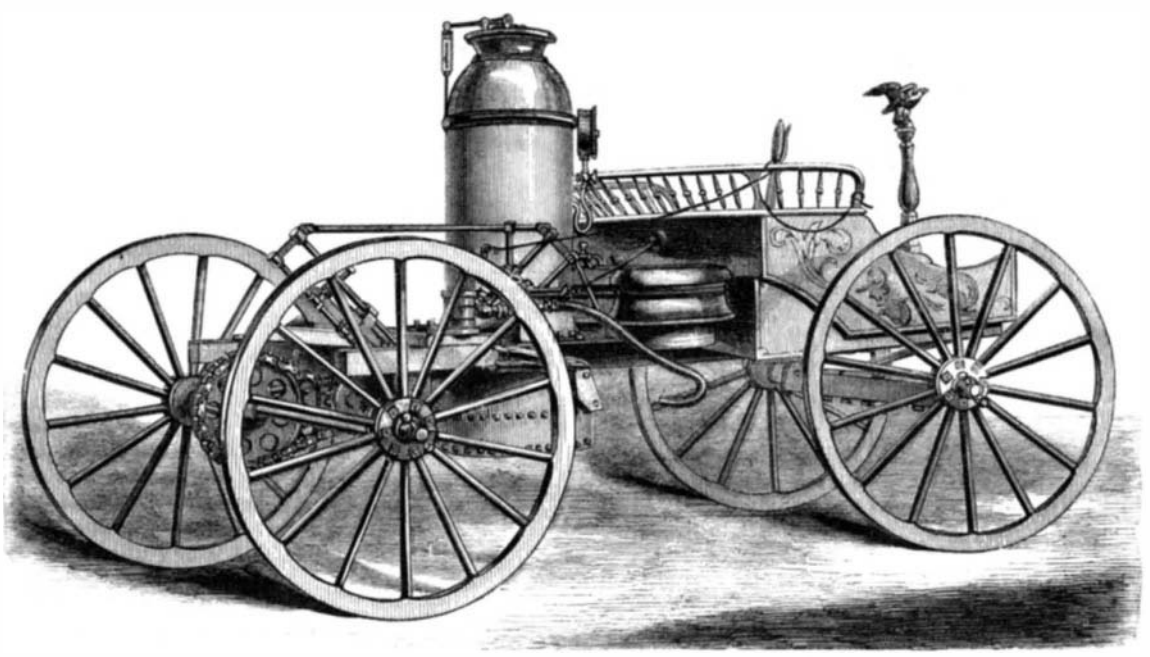
SCIENTIFIC AMERICAN

A WEEKLY JOURNAL OF PRACTICAL INFORMATION, ART, SCIENCE, MECHANICS, CHEMISTRY, AND MANUFACTURES.

Vol. XVI.---No. 3. [NEW SERIES.] NEW YORK, JANUARY 19, 1867. $3 per Annum [IN ADVANCE.]

Improved Traction Engine.

It is well known that the traction engine is largely used in England for farm and draft purposes, but it has not yet assumed the same importance here. For agricultural labors Americans prefer the portable engine, and whatever efforts have been put forth to produce a traction engine have been mostly directed to the completion of a a successful road-running machine. The object, however, of the builder of the machines, one of which is represented in the engraving, is to produce a self-propelling steam carriage for running on common roads, or on the ice, and an engine that can be adapted to the work of the farm, to driving thrashing or other machinery, pumping from wells, watering gardens, and many other purposes.



WARE'S COMBINED STEAM CARRIAGE AND ENGINE.

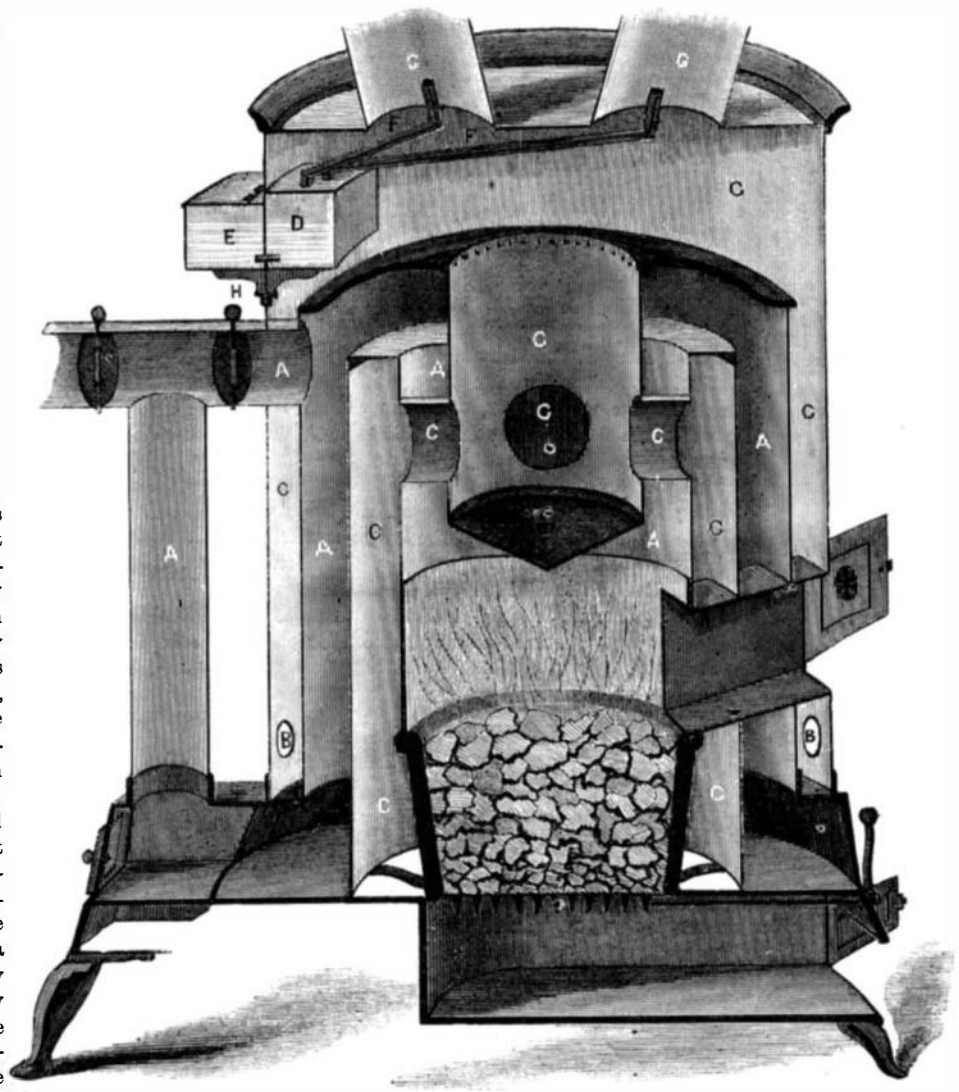
The appearance of the machine in one form is seen by the engraving. As a carriage it presents a graceful appearance. The boiler is hung between the forks of a frame of steel, which meet on the forward axle and thence backward diverge, holding the boiler suspended in the triangle thus formed. This frame of steel, edge up, is twisted a half turn on each side of the boiler, thus acting as a spring The engines work on an incline and drive a shaft with a chain wheel, which, by a machine chain, rotates the driving shaft and wheels. The engine is intended to give three revolutions to the first shaft to one revolution of the driving wheels, thus gaining power for ascending inclines. The difference can be multiplied to nine times. A lever in front of the driver's seat serves, by a simple mechanism, to guide the machine when used as a carriage, and a rod with handle connected to the engine shaft readily reverses the motion of the engine.

As will be seen, the machine is a complete engine in itself, capable of doing the work ordinarily done by the portable or stationary engine, and also adapted for locomotion. The inventor is confident that his machine can be made a success, as all those he has yet built perform their work admirably.

For further particulars address Elijah Ware, Bayonne, N. J.

Sanitary House Warming.

A few months ago we presented to our readers an engraving of the Whittingham Moist Warm Air Furnace, and herewith is an engraving of the Whittingham Moist Warm Air Portable Furnace, which is constructed of cylinders forming alternately annular passages for smoke and air, in such a manner as to utilize all the heat that may be generated in the fire-pot. The products of combustion pass through the passages, A, while cold air, introduced through the bottom of the furnace and holes, B, in its outside galvanized-iron casing, passes through the passages, C. By this arrangement a very large heating surface is obtained, and as it is a well-established fact that the heat to be realized from a furnace does not depend so much on the amount of fuel consumed as on the amount of heating surface the fuel is made to act upon—(air being a non-conductor of heat, receives caloric only by contact)—this furnace embraces every quality to enable it to heat a large volume of air economically, and can be manufactured at small cost. It is estimated that one of the size represented in the engraving (scale one inch to the foot) will heat a house 20 feet wide, 40 feet deep and four stories high.



THE "WHITTINGHAM" MOIST WARM-AIR PORTABLE FURNACE.

The water evaporator, D, placed in the upper part of the air chamber, is fed from the reservoir, E, upon the outside, and the vapor tubes, F, convey the vapor from it directly into the distributing air flues, G, thereby returning to the atmosphere the moisture it loses in passing through the furnace, thus rendering it mild and pleasant, instead of dry and arid. H and I are dampers, one, H, when open to give direct draft for lighting a fire, and when closed to change its course, and the other, I, to check the draft when required. J is a damper, of which there are three, to be opened for the purpose of cleaning the smoke passages.

The objections to furnace heat are happily obviated in the Whittingham furnace, as over its extensive heating surfaces an immense volume of air is warmed, and by the simple adjustment of the water evaporation into the air flues, the atmosphere is tempered to the mildness of a spring day.

Patented through the Scientific American Patent Agency, by Henry Whittingham, and manufactured by Wm. H. Church & Co., office and salesroom No. 211 Water street, New York City, of whom further particulars may be obtained.

BORAX---AMERICAN AND FOREIGN.

The recent development of this useful and interesting chemical in commercial quantities from the bed of a lake in California, naturally draws popular attention to the nature, uses and sources of the article. Its chief importance is in welding and brazing of metals. Applied to the heated surface, it at once dissolves the coating of oxide and protects the cleansed bright metal from further oxidation which would obstruct the union of the particles. It effects this by the eager affinity of its base (boron) for oxygen, with which it is always found in union, in the form of boracic acid, free or combined. The salt formed by three parts of the acid with one of soda, is the bi-borate of soda, commonly known as borax.

Boron is a very interesting substance. It is obtained chemically, in three conditions analogous to those of carbon, viz., as a dark-brown powder, a substance resembling black lead, and crystallized. The crystals constitute an artificial diamond, with the distinction that they are boron instead of carbon, some of them equalling the diamond in brilliancy, refractiveness, and hardness, though tinted with red or yellow coloring matter, and marred by laminæ of aluminum, from the boride of which the crystals are deposited. Being readily adulterated with common salt, alum, and phosphate of soda, the purity of borax is a question of practical importance with manufacturers. It has been found containing as much as twenty per cent phosphate of soda. The new California article, as we are informed by manufacturers who have tried it, is inferior in no respect but appearance, to the best imported. But as all borax is alike susceptible of adulteration, tests may well be employed by those who wish to produce superior work in metals. Alum may often be detected by the taste, and also by adding ammonia to a solution in water which converts the whole into a thick jelly by precipitation of the alumina. Litmus paper also reveals the acid reaction of alum in turning the blue to red. Phosphate of soda may be detected by exposing the borax to the heat of a drying room for a few hours, when the phosphate will effloresce, and may be picked out.

Borax is found in a crude state in Thibet and Persia, on the borders of certain lakes, the waters of which also yield it by evaporation. It also abounds in the great sandy desert extending inland from the coast of Peru and Ecuador to the Andes, and is here much mixed with borate of lime. The refining of crude borax has been carried on for centuries at various Mediterranean seaports, principally Venice, whence the general name Venetian borax, as applied to the refined article. Our importations of crude and refined borax, mostly the latter, as shown by the custom-house returns, amounted to 655,976 lbs. in the last four years, or an average of about eighty-two tuns per annum. But this amount is not more than one third of the quantity really imported, as the difference in duty has induced the importation of Italian boracic acid, to be manufactured here, by the addition, as above noted, of 33⅓ per cent of soda. Probably the average annual consumption in the United States does not vary very far from 500,000 lbs.: an amount which the California borax lake, if we may believe reports, is already yielding, with 300,000 lbs. more for exportation, and an unlimited supply in prospect. In consequence of this, the importation has virtually ceased. At the same time, the Italian article has been deteriorating for some time by the increase of foreign ingredients as yielded from the earth, and