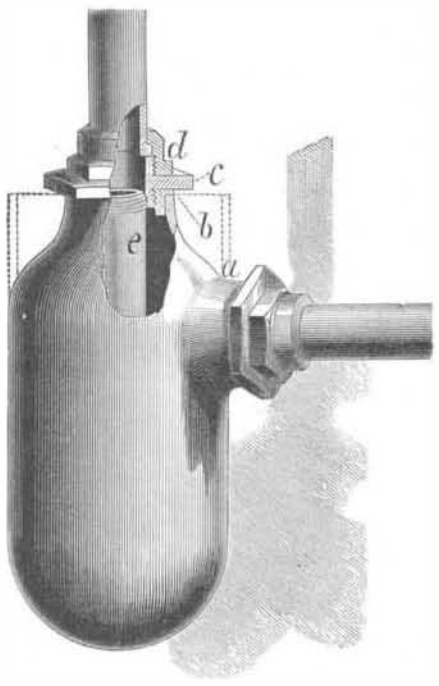
REMOVABLE BOTTLE TRAP.

The object of an invention recently patented by Mr. G. M. McCloskey, of No. 191½ Atlantic Avenue, Brooklyn, N. Y., is to facilitate the cleaning of bottle traps and also to increase the ease of attaching and detaching the traps from the pipes. The body of the trap is cast in the shape of a cylindrical cup, as indicated by the dotted lines in the engraving. The open end is spun so as to fit upon the screw tube,



McCLOSKEY'S REMOVABLE BOTTLE TRAP

b, which is soldered in place, and into which is screwed the tubular part, *c*. Upon the outer part of the tube is screwed the coupling ring, *d*, whose inwardly projecting flange holds the inlet pipe firmly in place. The pipe, *e*, is screwed into the inner end of the tube, *e*, so as to form a continuation of the inlet pipe extending nearly to the bottom of the trap. The upper part of the side of the trap is cast upon a female screw similar to the one shown at *b*. The outlet pipe is held in place in the same way as the inlet. With this construction the trap can be disconnected from the outlet and inlet pipes by unscrewing the coupling rings, so that it can be easily cleaned and replaced. The trap being cast in one piece, soldering of the parts is done away with.

CORN PLANTER.

The annexed engraving represents an invention patented by Mr. Charles J. Mikesh, of Conover, Iowa, which is designed to facilitate the operation of corn planting. The wheels are made with wide concave rims to adapt them to cover the seeds. The ends of the axle are attached to the side bar of an outer frame which incloses the machine, and to the forward end of which the tongue is secured. An inner frame, fitting in between the hubs and resting upon the axle, oscillates freely between the cross bars of the outer frame. To a support attached to the rear bar of the outer frame is pivoted the end of a lever which, at a short distance from the end, is joined to the inner frame by a bar. The forward end of the lever moves along a notched circular bar as shown. By moving this lever the inner frame is oscillated, and by means of the notched bar and bolt, which is operated from the handle, the frame can be locked in any desired position.

To the lower ends of angular shaped bars journaled upon a cross rod are attached plows which open the furrows to receive the seed. A spring bearing upon the horizontal portion of the bar holds the plow down, yet permits it to move up when it encounters an obstruction. This construction is clearly shown in the engraving, in which the forward part of the side bar is cut away. The seed boxes are secured to the forward cross bar of the inner frame. The two seed dropping slides are connected by a rod which is joined by a link to an arm projecting upwardly from the end of a short shaft whose other end is rigidly attached to the center of a bar, which is so placed that the driver, when sitting upon the seat, can rest his feet upon the ends and so operate the seed dropping slides. The slides at the lower ends of the boxes receive the seeds from slides placed near the center (both sets of slides are operated by the same bar), and at the next movement of the dropping mechanism drop the seed in a bunch through the funnels to the ground.

Efficiency of Coal.

A pound of average coal develops, with perfect combustion, 12,000 units of heat, which, multiplied by 772, the mechanical equivalent in units of work of one unit of heat, equals 9,264,000 foot pounds of work, representing barely a consumption of one-quarter pound of coal per indicated horse power per hour. The very best engines of modern times, leaving out only a few exceptional cases, require not less than 2½ pounds of coal per horse power per hour. The average engine uses very much more.

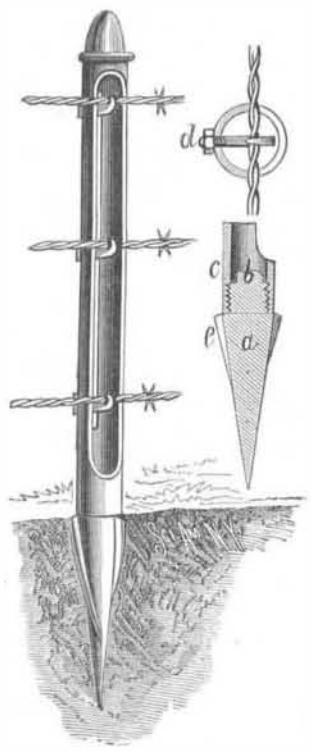
Keep Your Eyes on Congress.

"Some of the bills now before Congress, notably those of Mr. Anderson and Mr. Voorhees, should they become laws, would prove a death-blow to our most flourishing industries. They would be more disastrous in their effects than an immediate adoption of absolute free trade. They would rob honest men of the fruits of their brain labor in order to benefit a few who are too lazy mentally, morally, and physically to exert what little ability the Lord in His generosity saw fit to waste on them.

"Shame on all who do not stand up manfully in defense of the right of every man to enjoy the honest fruits of his labor, mental or physical! More shame on those who, being intrusted with the duty of protecting those rights, neglect that duty, and are silent when their voices should be heard in vigorous protest! But greatest shame of all on those who willfully betray their trust and besmirch their reputations by advocating this wholesale robbery of a class of men to whom the nation is indebted for much of its present greatness!"—*Sewing Machine Journal.*

IMPROVED FENCE POST.

The base of the post consists of a cast iron point, *a*, having spiral flanges, *e*, and a shoulder above which is a screw threaded section and a driving head, *b*. This section is driven into the ground about to the shoulder. The upper section is made of a suitable length and size of gas pipe, about one-half of which is cut away as shown in the accompanying perspective and sectional views. Through the back of the remaining part is cut a slot which is nearly as long as the open front portion. The lower end of the pipe is screw-threaded to fit upon the ground section, and the upper end is fitted with a plug. Wires are secured to the posts by hook headed bolts (shown at *d*, in the cross sectional cut) which extend through the slot, and are held by nuts so as to draw the wires firmly against the two edges of the post; two bearing points are thus formed, against which the wire may be clamped and securely held at any desired height.

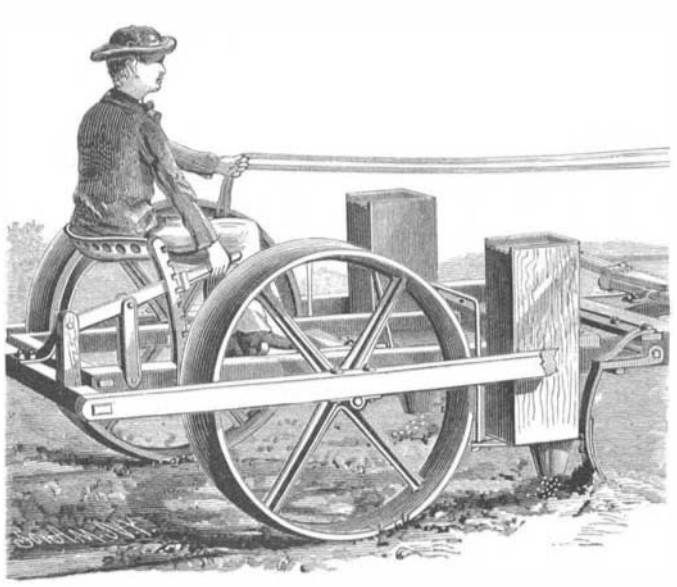


MINER'S IMPROVED FENCE POST.

When deemed advisable, in order to make the fence more easily visible to animals, the upper hook may be replaced by a bolt, having an L form, for holding the lower edge of a board, the upper edge being passed under a lip formed in the top of the pipe.

This construction makes a simple and durable post which can be quickly and easily set.

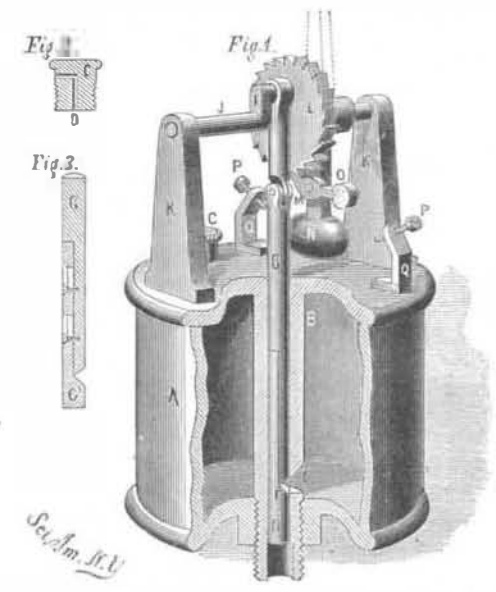
This invention has been patented by Mr. E. D. Miner, of Dayton, Washington Territory.



MIKESH'S CORN PLANTER.

IMPROVED VALVE OILER.

The accompanying cut shows an invention, recently patented by Mr. S. D. Mershon, of Rahway, N. J., which is designed to facilitate the oiling of the moving parts of machinery, and also to secure regularity in the amount of oil delivered. Through the center of the oil cup, A, passes a tube, B, which may be made solid with the top and screwed into a hole in the bottom. Oil is introduced into the cup through an opening in the top that is closed by a cap, C, having a hole, D, through it, as shown in the sectional view, Fig. 2, in order to admit air to the cup to take the place of the oil as it is discharged. In the lower part of the



MERSHON'S IMPROVED VALVE OILER.

tube, B, is an opening, E, through which oil passes to the interior and enters the recess, F, in the rod, G. This rod fits accurately in the tube, and its lower portion is made up of two halves held together by screws passing through short slots in the extension part, G', as indicated in the longitudinal section, Fig. 3. When the rod is raised, the recess comes opposite the opening and becomes filled with oil; as the rod moves downward the oil in the recess is carried with it and flows out through the lower part of the tube to the surface to be oiled. The upper part of the rod is jointed, and its upper end is attached to a crank formed upon a shaft, J, revolving in bearings, as shown. At each revolution of the shaft the recess, F, discharges its contents. On the shaft is secured a ratchet wheel, L, into the teeth of which meshes the end of a pawl, M, which is pivoted to, and operated by, the swing of the pendulum, N. The pawl is held in gear with the wheel by the weight on the arm, O. The jar of the engine will keep the pendulum in motion; but it may be extended as indicated by the dotted lines and actuated by an arm attached to some moving part of the machinery. The swing of the pendulum is limited by the set screws, P, passing through the upper ends of the standards, Q. By means of the set screws the movement of the pendulum can be regulated so as to move the wheel through the space of one or more teeth, thereby increasing or diminishing the time required for the shaft to make a revolution, and thus regulating the time between the discharges of oil.

Lead Pencils.

With the improved machinery now used, ten hands will make about four thousand lead pencils of the cheaper grade a day. The cedar comes chiefly from Florida, and it is received in slabs of pencil length, one for the lead to go in and the other to cover it, as may be seen by examining the end of any lead pencil. Four little grooves are sawed in the thicker slabs, for the leads, which are kept in hot glue and taken one by one and inserted in the grooves. Then the thin slab is glued to the leaded slab, and, thus united, they are run through a moulding machine, four pencils coming from each slab. After the ends are rasped they are run between grooved wheels at considerable pressure for the only finish they get. This burnishes them, and they are tied in dozens and boxed for sale, mostly in plain wood, and of three degrees of hardness. The graphite used comes in a fine black powder, and is mixed with German white clay, about half and half, and then ground with moisture, forming a paste. This is pressed in dies into lengths of four leads, which are cut and then baked at a very high temperature. These sell at 85 cents, $1.50, and $2 a gross, and are very good articles, writing smoothly and evenly. The manufacturer makes about one hundred per cent, selling the pencils at eighty-five cents a gross, and the retailer makes a good thing selling them at a cent a piece. The graphite costs about twenty-five cents a pound, and the clay little more than the freight. The more clay is used in the leads the harder they will be. The cedar is cut mostly from fallen trees in Florida swamps.—*Geyer's (N. Y.) Stationer.*

THE report that a party of Americans intend purchasing the volcano Popocatepetl or Vesuvius, and erecting extensive works there for the mining of sulphur and the manufacture of sulphuric acid, lacks confirmation.

A New Commercial Treaty with Mexico.

Any legislation which has a tendency to make it easier for manufacturers to export the productions of our workshops and factories cannot fail to meet with general appreciation, while it will be particularly welcome to the mechanics and artisans of every trade. Of such a nature is the new treaty with Mexico, ratified by the United States Senate March 11. Nearly all our exports heretofore have been of agricultural productions, but a proper growth and healthy expansion of our manufacturing industries cannot be steadily maintained without materially enlarged foreign markets. We need more customers ready to take our surplus of manufactures, above what is required to fill the home demand, and it is eminently proper that we should take a step in advance in this direction by making a sort of reciprocity treaty with our neighbors in the Southwest, of the Mexican Republic. They are in want of many things now, and with the opening of new railroads through the country will want far more, which it would be, indeed, a pity to send them to Europe to buy while our factories are far from being overworked.

Under the treaty, which has just been ratified by the U. S. Senate, the chief agricultural products of Mexico, including leaf tobacco, are to be admitted to the United States free of duty. The list of articles on the free list embraces few manufactures, and contains many entries now admitted free. Among the manufactured articles is sugar of not above No. 16 Dutch standard in color. The schedule of articles to be admitted free into Mexico from the United States contains over seventy entries, and comprises five great classes of manufactures—railroad machinery, steam engines, agricultural implements, mining machinery, and building materials. To these are added coal of all kinds, petroleum, naphtha, precious metals, sewing machines, vehicles of all kinds, clocks, stoves, and many minor manufactures and materials. The treaty will remain in force for six years.

The Power of Boilers.

At a recent meeting in Manchester of inspecting engineers and other gentlemen interested in the inspection of engines and boilers, the question of the so-called horse power of boilers was raised by Mr. Boswell, and the debate which followed was well sustained, the general opinion being that the term "horse power" as applied to a boiler was wholly wrong, and should be abandoned. It was suggested that boilers should be rated by their evaporative capacity; but to this it was objected that the factors of this capacity were—quality of coal and water, the method of seating adopted, the area and altitude of the chimney, and, not least, the brains or skill of the fireman. Mr. Richard Thompson, the senior inspector of the Manchester Steam Users' Association, contributed very greatly to the interest of the debate by his contribution of facts acquired in actual experience, as did also the majority of those present. It appeared that a full-sized Lancashire boiler, 7 feet by 28 feet or 30 feet, might, so far as horse power was concerned, develop anything up to 380 or 400 horse power, according to the conditions, which would of course include a very economical engine. A fact of great value, not sufficiently known, was brought up, namely, that when the evaporative efficiency of a Lancashire boiler was being tested at atmospheric pressure, the whole of the steam generated being discharged through a short 6 inch pipe with one right angled bend in its length of a few feet only, the pressure in the boiler rose to 3 pounds per square inch by the gauge, showing most conclusively that at such a low pressure it requires a safety valve to a boiler with at least an outlet area of 25 square inches. Whatever may be the pressure in a boiler, it will practically evaporate the same weight of water, but an orifice will practically discharge a constant volume at all pressures, and the volume varying almost inversely with the pressure, a safety valve will discharge more steam at a high than at a low pressure, and therefore a high pressure boiler does not require so great an area of safety valve as does one at a low pressure.

An Anecdote of Peter Cooper.

The head of the Women's Art School of Cooper Institute writes of Peter Cooper, in the *Century:* "One day he stood watching the portrait class, who, to the number of thirty pupils or more, were drawing likenesses of the same model from different positions. One scholar made the face in profile; another had it turned a little into the shadow; a third saw more of the full face; while others worked still further into or away from the light. He had stood observing the scene for a few minutes, when he said, 'Such a sight as this should be a lesson in charity, when we perceive how the same person may be so different, according to the way he is looked at by various people.'"

PANCLASTITE.

The new explosives known as panclastite, which have attracted so much attention from engineers and chemists, form a group which has no connection with any other known explosives. They are possessed of peculiar properties and power, and merit a description. The combustive element of this new section of explosive bodies, which is the discovery of Mr. Eugene Turpin, is peroxide of nitrogen. The combustible body may be formed of different substances, such as sulphide of carbon, petroleum, toluene and xylene, benzoles, and vegetable and animal oils. Each of these substances gives a different explosive endowed with special properties. Another group is formed of a mixture of peroxide of nitrogen with nitrobenzine. This latter group gives products of great stability. In fact, the combustible being already nitrated to saturation by nitric acid, the peroxide of nitrogen has no action upon it, and intervenes, merely as a combustive, by its simple admixture, to render it explosive. These compounds are specially adapted for military purposes.

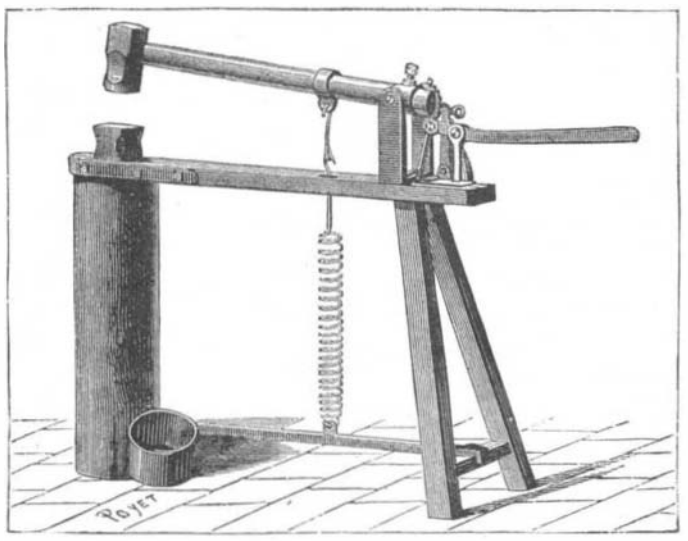


Fig. 1.—TURPIN'S PERCUSSION APPARATUS FOR EXPERIMENTING UPON EXPLOSIVES.

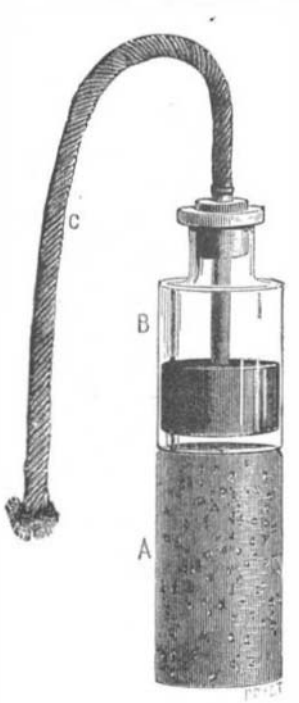


Fig. 2.—ARRANGEMENT FOR TESTING POWER OF EXPLOSIVES.

In principle, panclastite for industrial purposes consists of two liquids, one soluble in the other, which are inert taken separately, but which it is only necessary to mix together to at once obtain, without any other operation, an explosive that is more powerful and more instantaneous than nitroglycerine.

Certain mixtures thus obtained resist shocks better in the liquid state than any other known explosives, even ordinary mining powder. Ordinary powder explodes under the shock of an iron weight of six kilogrammes falling from a height of half a meter. Gun cotton and other products of the same section explode under the fall of the same weight from a height of a quarter of a meter. Seventy-five per cent dynamite explodes under the same weight falling 0·15 meter, and dynamite gum explodes under a fall of from 0·20 to 0·25 meter. Pur nitroglycerine explodes under a fall of 0·10 to 0·15 meter. Panclastite in a liquid state does not explode under the shock of the same weight falling *four meters.* All these experiments were made under exactly the same conditions by means of apparatus constructed by Mr. Turpin, and one of which is shown in Fig. 1.

Certain compounds of panclastite are non-inflammable, while others are more or less inflammable, but never detonate through fire alone, in an open vessel. All the inflammable compounds burn quietly in the open air. It requires a preliminary explosion to bring about one of panclastite, such, for instance, as that of a primer charged with fulminate of mercury. Certain of the compounds burn so quickly and with so brilliant a flame that Mr. Turpin has been led to devise a portable apparatus for optical telegraphy at night, in which this material is used as an illuminating agent. Panclastite, considered as an explosive, enjoys the peculiar and valuable property that its sensitiveness and power may be varied at will. All the experiments with it have been made with the mixture that is least sensitive in a liquid state.

But its sensitiveness may be made such that a hermetically closed vessel filled with the mixture will explode under its own weight in falling from a height of from one to two meters upon hard ground. On the contrary, the sensitiveness may be made so slight as to make it impossible to explode it under the influence of a primer charged with 3 grammes of fulminate of mercury. Finally, as with nitroglycerine, panclastite may be united with an active porous substance, such as powder, vandanite, etc. In such a case, it again loses its sensitiveness to shock.

When dynamite and panclastite are caused to explode in the open air upon leaden cylinders, it is found that the effects produced by panclastite are infinitely superior to those obtained with a larger quantity of dynamite.

Fig. 2 shows the arrangement before the explosion. A is the leaden cylinder, B is a bottle placed upon it and containing the explosive, and C is the priming and fuse. Here the bottle is represented as containing 10 grammes of panclastite.

Fig. 3 shows the leaden cylinders before and after the explosion. No. 1 represents the cylinder before the explosion, No. 2 the same cylinder crushed by the explosion of 20 grammes of dynamite gum, and No. 3 a cylinder crushed by the explosion of 10 grammes of panclastite. As may be seen, the effect produced by the new explosive is greatly superior to that given by dynamite, notwithstanding that the former be used in much less quantity.

Among other open air experiments that have been tried with it we may cite the following: An iron rail was placed upon an oak tie, and, in the channel between the flange and head, there was laid a cartridge containing 60 grammes of panclastite primed in the ordinary way. When the fuse was lighted a violent explosion ensued and the rail was literally crushed into fine bits, the majority of which were driven deeply into the tie, the latter itself having been broken.

Some of the fragments of the rail weighed but a few grammes. For these details and the engravings we are indebted to *La Nature.*

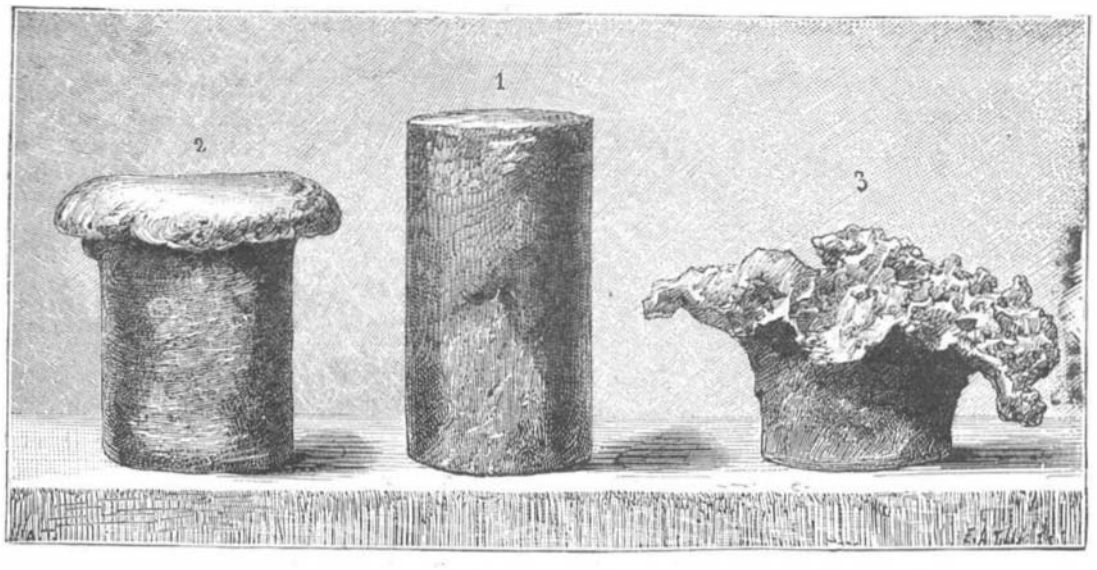


Fig. 3.—COMPARATIVE RESULTS GIVEN BY THE EXPLOSION OF DYNAMITE AND PANCLASTITE.

Air.

Mean pressure of the atmosphere, at the level of the sea, is equal to 14·7 pounds per square inch, or 2,116·4 pounds per square foot. One atmosphere of pressure is measured by a column of air at 32° Fah., 27,801 feet, or about 5¼ miles, high, of uniform density equal to that of air at the level of the sea.

The density, or weight, of one cubic foot of pure air, under a pressure of one atmosphere, or 14·7 pounds per square inch, is, at 32° Fah., equal to 0·080728 pound. At 62° Fah., the weight is 0·076097 pound.

The volume of 1 pound of air, at 32° Fah., and under one atmosphere of pressure, is 12·387 cubic feet. The volume at 62° Fah. is 13·141 cubic feet.

The specific heat of air at constant pressure is 0·2377, and at constant volume 0·1688, that of water being taken as 1