SCIENTIFIC AMERICAN

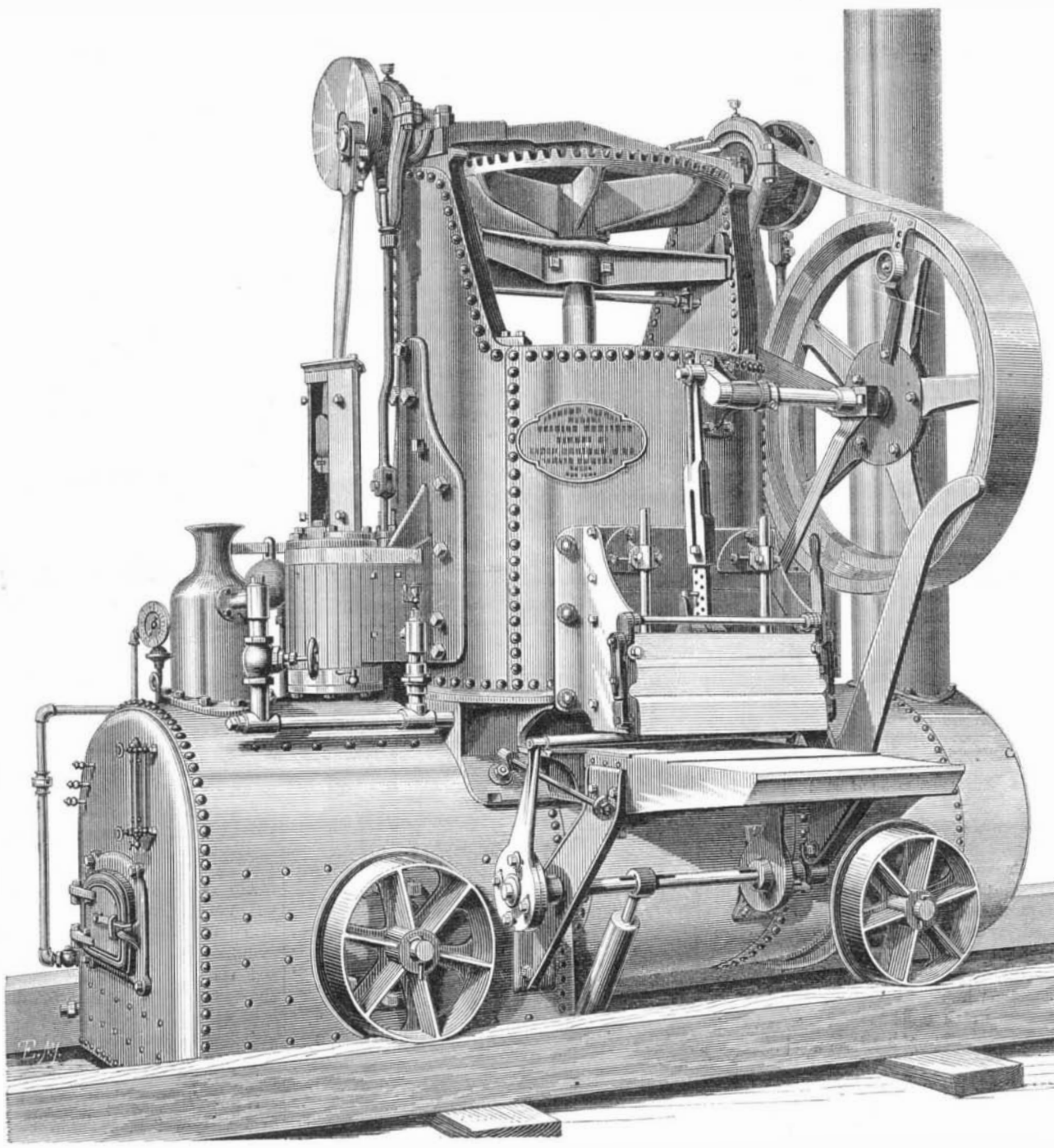
A WEEKLY JOURNAL OF PRACTICAL INFORMATION, ART, SCIENCE. MECHANICS, CHEMISTRY, AND MANUFACTURES.

Vol. XXVI.—No. 11. [NEW SERIES.] NEW YORK, MARCH 9, 1872. $3 per Annum. [IN ADVANCE.]

Improved Portable Steam Brick Machine.

This machine was illustrated and described on page 321, Vol. XXI., of the SCIENTIFIC AMERICAN, in which article its claims to superiority were fully set forth. The illustration referred to was from the original model of the machine, whereas the engraving we herewith present is from a photograph of a full sized machine, put in operation last season at Columbus, Ohio, and used for making the brick for the Ohio State Central Lunatic Asylum, one of the largest, if not the largest, structure of the kind in the United States, requiring over twenty-five millions of brick in the walls. It will be observed that the engraving exhibits some important improvements in its construction.

The general construction of the machine is as follows: The clay mill is placed on top of the boiler. It is composed of an outer and inner wall of boiler iron, between which water circulates for feeding the boiler, as well as for tempering the clay. A cock in the pipe under the cog wheel, which extends across and over the top of the clay, regulates the supply of water required to further wet the clay in the process of tempering it, while a steam pump on the back side of the machine supplies the water to this annular space in the clay mill, and also feeds from it the boiler. The form of the clay mill gives the requisite framing and strength for the attachment of engines and combination of the working devices. The steam cylinders are attached on opposite sides of the clay mill. These cylinders were, in the original model and machine, attached to the boiler, the expansion of which by heat tended to disturb the allignment of the working parts. The present position of the cylinders obviates this difficulty, and is a marked improvement on the original design. Improvements in the guides for the crossheads have also been made, by which no dust or grit can get to them, as the opening shown in front of the crossheads is closed by a door. The size of the boiler has been increased, the fire box greatly enlarged, while the whole boiler is built of heavier iron.



WINN'S IMPROVED PORTABLE STEAM BRICK MACHINE

As shown in the engraving, the machine is a boiler, engine, and brick machine combined; the whole placed upon wheels, so that it can be moved upon a track on the yard from one "pit" to the next. The boiler is 25 horse power, the cylinders are each 8½ inch bore, and the pistons have a stroke of 14 inches, and make from 40 to 60 strokes per minute.

The operation of tempering the clay, molding, and delivering the brick in molds upon the table, in front of the machine, is entirely automatic.

Reference to the engraving will show that the pinion on the longitudinal shaft (driven by the engines) drives the large bevel wheel upon the mixing shaft with its knives rotating among radial bars on the inner side of the clay mill; the clay is forced, by means of strong scroll wipers on the bottom of the shaft, into the press box in front of the clay mill, in which the follower is worked up and down by the crank on the shaft of the large pulley driven by a belt from the small pulley on the engine shaft.

The mold, when full, is forced out from under the follower at the proper moment, by the roller in the ends of the arms extending up from the counterpoised rock shaft, which is actuated by the lever, receiving intermittent motion from the trip wheel on one of the arms of the large pulley. The lever, trip, wheel, and arms, carrying the mold roller, are all adjustable, and the pressure can be instantly increased or diminished and varied from one to six inches, by means of the pin at the end of the connecting rod of the follower. The whole construction of the machine is substantial and very simple, and the slow motion of the engines and moving parts makes it very durable.

The patentee claims, simply, to make a first class common building brick upon the same principle, but superior to the best hand made brick, and at a much less cost. After a large experience, he does not consider the principle, upon which "dry clay" brick and "stiff clay" brick are made, as good as the method of the hand makers, which he, to all intents and purposes, carries out in this machine, namely, thoroughly tempering the clay and using sand upon the molds. The use of water and a thorough mixing of the clay to the consistency suitable for molding it into form, in his opinion, is the proper preparation for the chemical reaction which takes place in burning, and is necessary to make the brick homogeneous, even in texture, and free from grain, that they may be easily cut with the trowel to any desired shape, and obtain in the process of burning that porosity necessary to prevent the action of extreme heat and cold from expanding, bulging, or contracting the walls, or crumbling the brick.

To practical men, it is unnecessary to explain that sand, in the manufacture of brick, is a chemical necessity, but aside from this and its mechanical convenience in molding, it gives to the brick, after being burned, a sufficiently rough and granular surface to retain the mortar, the lime in which, under pressure of the weight of the wall, fills up the cells or interstices, and naturally and chemically adheres to the sanded surfaces.

The machine has been in use four seasons, and, according to numerous testimonials from practical brick makers now using it, makes 40,000 brick per day.

The proprietors also build the machine separate and unattached to a boiler or engine, which may receive power from a pulley on a line of shafting driven by a stationary engine or from other convenient source.

The machines are manufactured for the proprietors by John Cooper & Co., Mount Vernon, Ohio. For further information, or for machines, address Wright & Winn, Lock Haven, Pa.

Traction Engine.

Mr. John Greenslade, of Steeple-near-Maldon, England, has invented and patented, through the Scientific American Patent Agency, improvements designed for rendering traction engines, especially those used on common roads, well suited for descending or ascending steep inclines. This is sought to be accomplished by mounting the boiler, together with the engine, so that it may be maintained in a horizontal position, and thus keep the water always at the same level, whatever may be the inclination of the framing, whereby the priming of the engine is prevented, as well as injury to the fire box and tubes from excessive heat, such as is the case when the boiler is fixed to the framing in the usual manner.

The inventor connects the boiler and working parts of the engine so that they may all move together, and provides the boiler to which the said working parts are attached with pivots, trunnions, or an axis or axes, placed at or near the center or otherwise, so that one end of the boiler may counterbalance the other. The engine and boiler oscillate in bearings on the framework, which is provided with driving and steering wheels as usual.

The position of the boiler can be regulated by means of a screw or screws mounted to the foot plate and working in nuts carried on the rear end of the boiler, or the boiler may be adjusted in any other equivalent manner by means of which its rear end can be raised or depressed, as required, according as it is ascending or descending an incline. The front end of the boiler is also suitably supported for the purpose of avoiding undue strain on the oscillating bearings or framing when the engine is in motion. The cylinder may be mounted in any convenient position, and motion is transmitted therefrom to the driving wheels by means of chain or other gearing, through the medium of a pulley mounted on one or both of the boiler trunnions, pivots, or axle, which is prolonged to form an axis for the pulley; or any other equivalent arrangement may be adopted. By the above means, the working of the engine is not in any way affected by the variable positions of the boiler. The pulley for transmitting motion to the driving wheels being mounted at the center of oscillation of the boiler, the distance between the main shaft and driving pulley, as well as the strain, is at all times the same. The carriage and boiler can be carried on springs or not, as desired. It is claimed that these engines will be found very serviceable for the work performed by portable engines. One or more windlasses can

be attached under the framework, and can be driven by suitable gearing from the intermediate wheel, rendering them more suitable for agricultural or other like purposes.

STOVE MANUFACTORIES IN TROY.

One of the most interesting of a series of articles, describing the manufacturing industries of New York State, now in course of publication by the New York *Times*, is devoted to an account of the stove and other iron productions of Troy and its vicinity.

There are in Troy fifteen stove founderies, whose annual consumption of pig iron is about 20,000 tuns, and of coal, 10,000 tuns. They make 150,000 stoves a year, and give employment to over 1,000 moulders, about 250 mounters and fitters, 300 laborers in different departments of the business, and about 200 skilled pattern makers. This pattern making is quite an important branch of the stove business, a vast number of patterns being made and shipped to other towns in all parts of the country. The pattern is half the battle in casting stove plates, and has to be as true as possible, and to allow for expansion and contraction in the casting taken from it.

The extent and rapid growth of this trade may be judged from the statement that Troy now manufactures and sells annually 150,000 stoves, and there is, of course, no necessity for fetching any more down from Vermont, whence, thirty years ago, a cargo of stoves arrived in Troy for shipment west, over the Erie canal. They came down the Champlain canal from Vermont, and the young supercargo in charge of them is now a partner in one of the principal stove founderies in the city.

The stove business of Troy, prior to 1845, was limited to four establishments, the oldest of which dates back so far as 1812. A Mr. Arnold was the founder of it. He made his first essay in casting stove plates in 1814, and during that year the molders he employed were deserters from the British army, which had recently been defeated at Plattsburgh. Mr. Arnold conducted a limited business for some years, and then turned his foundery over to Mr. Stratton, a gentleman who, in after years, became foreman at the West Point foundery, and in 1840, he surrendered his interest in the foundery to James Wager, at present the senior partner in the firm of Wager and Fales, and generally regarded as the oldest stove manufacturer in the United States—not in point of years, but from the time he has been engaged in the business. From 1840 to 1854, he encountered many trials and pecuniary embarrassments; but he fought his way through them all, enlarged his foundery, quadrupled his business, and he secured a fortune before he left his own foundery in 1855, in spite of the competition created by the erection of half a dozen new founderies between 1846 and 1850. During those years, he developed marked and valuable improvements in cooking and heating stoves, bestowing great pains on the production of a smoother and better quality of castings. His stoves soon became popular and thousands were shipped to California and Oregon; a steady sale for them was found in Australia, and Canada became an extensive buyer in the Troy stove market. Alas! no longer so; the heavy duty on stoves from the States now closes that market to Troy New England and the South also began to draw a large supply from Troy; while the West began to make itself felt in the Troy market, and the shiploads of emigrants, arriving every week at Castle Garden, pointed significantly to that vast section of the country as a future mine of wealth to the stove founderies. Of late years Mr. Wager has had a fine business in the manufacture of stoves in association with Mr. Fales, under the style of Wager, Fales & Co.

Another great pioneer in the Troy stove business, but as an inventor rather than as a manufacturer, was Philo Penfield Stewart, born in Sherman, Fairfield County, Conn., in 1798. In his boyhood Mr. Stewart exhibited a strong fancy for perfect mechanical workmanship, and was constantly contriving and making miniature machinery. For this reason, I suppose, his parents compelled him to serve a seven years' apprenticeship to a saddler and harness maker, and were astounded to find out, at the expiration of his sentence, that the repository of strap oil did not agree with the lad's tastes. Of course it didn't. The boy's mind was bent on machinery, not on stitching bridles. We next hear of him working as a missionary among the Indians, and at thirty-five years of age, as founding the village and college of Oberlin in Ohio. About this time, poverty compelled him to practice economy, and after some study of cooking cooking stoves he succeeded in constructing one which only consumed three small sticks at a time. It was a stove with a fire box hanging in the oven, and was patented by him in 1838 Gradually Mr. Stewart turned his entire attention to the invention of new stoves; and when he died in 1868 the names of Stewart's stoves made a formidable list in the catalogue of stoves manufactured by Fuller, Warren & Co., who hold all his numerous patents. The dumping grate cooking stove was the result of his greatest efforts, and its capabilities are statistically set forth in the following extract from one of the journals of the day:

There were 265 loaves of bread baked, each loaf weighing 1¼ pounds, aggregating 332 pounds, or 50 pounds more than the equivalent of a barrel of flour; 72½ pounds of beef perfectly roasted; one bushel of potatoes baked and boiled; 2 barrels of water heated to boiling temperature, all accomplished with 24½ pounds of coal, at 3½ in the afternoon.

This is cooking by wholesale. If the master saddler and harness maker, to whom Stewart was bound, lived long enough to read the above extract, his ideas concerning the ability of the apprentice whom he thought so stupid must certainly have been considerably modified. Well, greater men than Mr. Stewart have been pronounced fools by their schoolmasters. Bacon was imprisoned for years on account of his scientific researches. DeCamp and others were confined as lunatics. Mr. Stewart may then be said to have succeeded "excellently well," considering the adverse influences which entramelled his early career.

A man who cannot suit himself with a stove in walking along River street Troy, must be one of those creatures—too often to be met—impossible to please. He could pick and choose between base burners, self feeders, gas consumers, patent bakers, hot closets, reservoirs, and a hundred other sorts; and if he happened to be a free handed, liberal minded kind of fellow, he would, in all probability horrify his economical Western wife by taking home one of each pattern.

The leading firm in the Troy stove business is that of Fuller, Warren & Co., in which Geo. A. Wells and Walter P. Warren are also active partners. Their foundery is on the Albany and Troy line, immediately adjacent to the celebrated Rensselear iron works, on the outskirts of the city, is known as the Clinton stove works, and is on a most extensive scale. It is a large brick structure, covering between five and six acres of ground, and furnishes employment to 400 men. The molding rooms are the finest I have seen. They are four in number, two being 150 feet square, and the others a little smaller. Four cupolas, with an aggregate capacity of seventy tuns a days, supply the molten metal for the castings. About forty tuns in the day is the average quantity run. During the busy months of the year, their labor pay roll amounts to $6,000 and $7,000 a week. Their great stoves are, of course, the different "Stewart" patterns, of which they make about 10,000 a year; but they also manufacture any number of furnaces and ranges. They have special arrangements with Mr. James A. Lawson, which give them the exclusive privilege of making the Lawson furnaces, including the "Diamond" and "Ruby" furnaces. Mr. Lawson took out his patent in 1864. Since then $800,000 worth of his furnaces have been made and sold by Fuller, Warren & Co.; and this year they fully anticipate making $250,000 worth of them. They are surface burners. Mr. Lawson, while fully appreciating the merits of base burning as applied to parlor stoves, maintains that the principle is not suitable for furnace heaters; and that a greater amount of heat can be obtained from a surface burner of the same power. These furnaces weigh from 450 to 2,800 pounds, and find a ready market, like the "Stewart" cooking stoves, from Bangor to San Francisco. Aye! even the delicate toes and fingers of the vailed ladies of the harems of Constantinople are warmed on a chilly afternoon by one of Lawson's furnaces.

These few figures and facts are all that are needed to point out the thriving condition of the city of Troy, and to call attention to the talents of her manufacturers whose wares are known in all parts of the world.

Colorado---Narrow Gage Railway.

The Colorado road, which has been constructed with great rapidity for seventy-five miles south of Denver, is intended ultimately to be built along the base of the Rocky Mountains to Sante Fe, thence to Albuquerque, thence to El Paso on the Mexican border, thence to Chihuahua and finally to the City of Mexico—a total distance of about 1,750 miles. When completed, it will be one of the most important lines of railway on the Continent.

Mr. Bowles says that the cost of building this road has been but $13,000 a mile, while the Kansas Pacific, which traverses a like region of country, cost $22,000. As to its working, he says:

The road and its trains, in the first place, look like a railway plaything in contrast with the broader and heavier tracks and larger cars of the accustomed lines; delicate and dainty, they seem almost too faint and feeble for the hard, quick work to which they are called, and especially unequal to the great contest which they have invited. Yet so far, surely they are performing their task with ease, with comfort, with celerity and success. The track bed of the narrow gage is 6 feet wide, as against 9; the distance between the rails 3 feet, as against 4 feet 8½ inches; the ties are 6 to 6½ feet, as against 8; the rails 30 pounds to the yard, as against 56; the engines 12 to 16 tons, as against 25 to 30 tons, putting about half the weight on the drive wheels that the large locomotives do; the passenger cars with 8 wheels, and carrying 32 passengers, weigh 6 tuns, as against 18 tuns, 8 wheels and 50 passengers; and the freight cars, thus far introduced, weigh 2 tuns, run on 4 wheels and carry 4 to 5 tuns of freight as against cars weighing 9 tuns on 8 wheels, and capable of 10 tuns load. Where four passengers sit in the ordinary car two three are seated in the narrow ones, two on one side and one on the other of the passage way, the car being divided in the middle by a door, and the seats for two and one respectively, being reversed in the two sections, so as to balance the carriage. The cars at first introduced are 7 feet wide, and 10½ feet high from rail to top. They prove a trifle more compact than is necessary, and not quite generous enough in accommodations for passengers; but this evil is being remedied in new cars now constructing; while sleeping cars and day drawing room cars can be made for the narrow gage roads, which will accommodate still more persons in proportion to their size and weight, than the ordinary cars of this character now do.

Starch.

According to the views of Mr. Alexander Macrae, of Liverpool, there is now a good opportunity for American starch manufacturers to enter the British market. He says:—"Starch crystals, whether made from wheat or potatoes, have been selling during the last ten years at an average price of $4.80 gold per 112 pounds, packed in flour barrels lined with blue paper. To-day the value is $7.20. The cause of this advance is due, in one instance, to the great falling off in the supply of Dutch farina or potato flour, and in the second instance, to the upset of agricultural development on the Continent, caused by the late Franco-German war. These deficiencies cannot be recuperated for some time to come, not only because material difficulties have to be overcome, but because the exigencies of other trades arising from that war have more sterling claims over men and money.

This, then, would seem the proper time for the American manufacturers to introduce their starch and farina into this market, and to found for themselves a reputation which will not suffer when Continental manufacturers again attempt to compete.

We can take in Great Britain alone at least 100,000 tuns per annum, and it is this disposition, to deal to so large an extent in wholesale packages, that commends itself to manufacturers who are now harassed by limited sales, and the labor and expense of small packages."

How a Man Feels when Freezing.

During the recent cold weather, Dr. McMillan, a young dentist, while traveling from North Middletown, Ohio, to the adjoining town of Paris, was overcome by the intense cold, and came near being frozen to death. He narrates his experience, in the *Cincinnati Enquirer*, as follows:

"After having proceeded about three miles on my journey, my feet became very cold. By stamping my feet upon the floor of the buggy I imagined I was perfectly warm, as my feet troubled me no longer, and the cold sensations through my body ceased. I, however, felt dull and sleepy, like a man who is drunk. I didn't care for anything. At this point, I believe, I began to freeze, and ought to have known it, but felt so comfortable that I did not examine my situation. After I had driven about three miles further my hat was blown off, but, being in a hurry to reach Paris, I did not stop to hunt for it. When I had proceeded perhaps a mile further, letting the reins lie in the bottom of the buggy and paying no attention to my driving, my horse shied off the side of the road and ran upon a rock pile. I then attempted to get the lines and pull him off, when I discovered I had lost the entire use of my right, and could barely use the left hand; with this one I attempted to pull him off the rocks, but the buggy wheels being locked, I could not do it. I then got out of my buggy, and in doing so struck the bridge of my nose across the wheel and cut it severely. I then went to the head of the horse, took hold of the bit and attempted to pull him around, but he would not move. I then commenced to unharness him, with the expectation of pulling the buggy off the rocks myself, feeling all the time very sleepy. When I had almost completed the task of unhitching the horse from the buggy, the desire for sleep became so great that I could bear it no longer, and I laid down upon the rocks by the side of the horse and went to sleep. I must have lain there some fifteen or thirty minutes, when I was aroused by a colored boy who found me. Upon his asking me where he should take me, I told him to Paris, still not being aware of my critical condition. Upon arriving in Paris, my feet were put into cold water, which entirely, I think, cured them, as they do not hurt me. My left hand does not give me much pain, and I think will be all right in a few days; but my right hand was badly frozen, nothing seemed to do it any good, and I am afraid I shall lose three, if not four, of my fingers. Last night, when I arrived in Paris, I could give no account of myself, but this morning I remember every incident."

AIR CUSHION FOR THE FEET IN RAILWAY TRAVEL.—A writer to the *Medical Times and Gazette* refers to the fatigue of the limbs produced after a long railway journey as due mainly to the trembling motion of the floor under the feet, and states that, having suffered considerably from this abuse, he was induced to try the experiment of using the well known air cushion as a footstool. This answered so well that he has never travelled without using one in this way, and has found the effect to be a remarkable improvement.

If the air spring is good for the feet it must also be good for the whole body. Perhaps some ingenious person can devise a car seat, elastic throughout that will afford real comfort to the traveller.

IMPROVED CRUCIBLE.—A crucible for melting metal has been invented, which consists in providing the ordinary crucible of plumbago or other substance with a flue or passage from the bottom to the top, for allowing the heat to act, upon the center of the mass of metal contained in the crucible, more directly than it otherwise can. This passage is surrounded by a shell or tube of the same material of which the crucible is made. The inventor also grooves or indents or constructs the sides of the crucible, both inside and out, so as to form projections to interlock with the paste, clay, or other substance with which the crucible is coated, to cause the coatings to be retained much longer than they now are, thereby preserving the crucible much longer, and reducing the cost of melting steel or other metals.

MONSTER OF THE DEEP.—At Norwich, Conn., at a recent descent made by one of Mr. Fuller's divers in Shetucket, he fell, unexpectedly, into a fissure between the rocks at the bottom, nearly twenty feet deep. Here he was assailed by a large animal, half serpent and half fish, which snapped viciously at the eye plates of his helmet, and though repeatedly struck with an iron bar, was with difficulty driven away.