

## Building and Heating Houses.

As houses have always been built, there is great loss in heating them, except by the use of a stove with a long pipe, or a hot-air furnace; the latter placed in a room which you wish heated, instead of in a cellar or basement, where the heat from the furnace is lost. In grates and fire-places, I presume fully three-fourths, if not more, of the heat goes up the chimney and is lost. These are the most healthy and pleasant, and we, therefore, generally put up with the loss of the heat for the sake of their superior comfort and convenience.

But is there no way to build a house whereby we can combine the economy of the stove and pipe with the advantages of the open fire-place? If it could be made to draw well I would propose hollow outside walls, made of three instead of two walls. The first cost of a house would be somewhat increased by building in this manner; but the more uniform temperature of the atmosphere within, to say nothing of economizing fuel, would much more than compensate for this increased cost, with all by whom comfort and good health were the chief objects desired. The outside wall would absorb all the moisture and frost, requiring none of the inside heat to neutralize it; and the air between it and the middle wall would be a good non-conductor. Then let the heat from the fire-places pass between the inside and the middle wall, making the whole circuit of the house, from bottom to top, and finally escaping with the smoke from short chimneys or ventilators in the roof. Thus all the heat would be economized, and a temperature be imparted to the inside wall, and from that to the room, sufficient, with the fire in the open grates, to warm a building in the most agreeable manner. The heat from the kitchen range also may be thus used. The Russian stove is made upon this principle, and I never experienced more agreeable heat than its finely polished walls give out into the rooms.

With such walls, a house would be cooler in the summer and warmer in the winter; making the temperature much more equable throughout the year. A flue may be introduced to carry off the heat from the kitchen range in the summer.

I have but one fear about this system, namely, whether a good draft can be got between such open walls? Each fire-place should have its own division of space to heat; for, if there is more than one opening, of course there could be no good draft.

Another great advantage in hollow walls is, that you can plaster on to the inside wall, and thus make your house rat, mouse and even bug proof. All these creatures to me are an intolerable nuisance, and should never be permitted in any decent house.

A.

## Observations on Rain in a Balloon.

Mr. Glaisher, the English aeronaut, has published an account of his thirteenth ascent, in a balloon, for scientific purposes. It took place on the 26th day of July last, from the Crystal Palace at Sydenham. His objects were to determine whether there was a stratum of cloud at a certain elevation above that from which the rain drops fell; also to determine the size of the rain drops at different elevations. Mr. Glaisher's conclusion is, that whenever rain is falling from an overcast sky there is a second stratum above, but with an overcast sky and no rain, then the sun is shining on the upper surface of the clouds. In regard to the second point, he says:—"The size of the rain drops as they fell on my note-book before starting, was fully as large as a four-penny piece; they decreased in size on ascending; but our upward movement was too quick, and we soon passed out of rain. On descending from above the clouds, we first encountered a dry and then a wet fog; passed into that which may be described as damp air or exceedingly fine rain; then experienced very fine but decided drops of rain, like pins' points, covering the note-book; these increased in size on approaching the earth, but more rapidly when very near the earth. The drops of rain, on returning to the earth, were as large as those noted on leaving, and rain had been falling heavily all the time we were in the balloon."

ERRATUM—WIRE PLATES.—In the useful table published on page 108, current volume of the SCIENTIFIC AMERICAN, the heading "Plates—per Lineal Foot," should be "Plates—per Square Foot."

## WORKING STEAM EXPANSIVELY.

The Government has appointed a new series of experiments to be made, upon the subject of working steam expansively. These experiments will take place under the direction of two commissioners—Horatio Allen, Esq., President of the Novelty Iron-Works, in this city, and B. F. Isherwood, Chief of the Bureau of Steam Engineering, at Washington, D. C. These trials are to be conducted in the most careful manner, and with entirely new mechanical apparatus, constructed expressly for the purpose, with a view to great precision in the results. The arrangement of the machinery is known to us, and we shall enlighten our readers upon the details at an early day, laying the results of the experiments before them as soon as they are completed. We think these trials, for there will be several, will be conclusive, and settle this vexatious question at once and forever.

## MISCELLANEOUS SUMMARY.

ENGINEERS ON CAPTURED VESSELS.—Engineers in the Navy who are transferred to prizes are usually supposed to have a fine time; the following extracts from a letter to a daily paper will serve to disabuse the minds of those who entertain such ideas:—"The lamps are trimmed and watches set, and all hands prepared for a lively time; but a storm springs up and causes our vessel to leak. The pumps went work, being choked with fine coal. Fisher goes down into the bilge, and stands, up to his waist in water, till he gets the bilge pump in operation; but that only lasts a short time, for it soon gets choked again, and recourse is had to the bilge injection, which keeps the ship clear. All night we worry along, with the expectation that morning will bring relief; Fisher and myself having been passing coal and firing up with but few hours rest since we came aboard. Jones has just carried away the check-valve on the after boiler, and we have had to haul the fires, &c." It was very culpable in "Jones" to carry away the check-valve. He should have been put in irons, or made to bring it back instantly.

OIL REMEDY FOR FLIES.—The New Haven *Courier* says:—"The annoyance of these summer pests to animals can be greatly mitigated, by the use of a mixture of one-third kerosene oil, and two-thirds lard oil, applied to the legs of horses, oxen or cows, with a feather or brush; or, what is better, but more objectionable to the applier, with the hand, rubbing it well in. A farmer in the neighborhood used it last summer on his oxen, having it applied twice a day on their going out to work—morning and noon. His cattle gained in flesh during fly-time. I have used it on horses and two cows. Its benefit is immediately observable. A horse, uneasy, fretting and stamping, becomes at once quiet, after the application. Those who sympathize with the noble animals in the constant teasing endured by them from these pests, will be glad to use any harmless remedy, which will spare incessant work, when not called to labor in harness. Horses will keep better on a less supply of food, for the repose thus obtained."

A BIG BLAST.—The Lake Superior *News* notices a remarkable blast, which took place near Marquette recently. In ordinary blasts, a hole of an inch and a half in diameter is drilled; but in this case one of four inches and eighteen feet deep, was made, distant from the edge of the cliff about ten feet, into which one keg of powder was put, and exploded as preliminary, which had the effect to open a seam to a depth of fifty feet. Sixteen kegs of powder were then put in as a final charge, which threw down over 3,000 tons of ore, so completely broken up, that the largest portion was small enough to load on the cars for shipment, without further reduction.

USEFUL HINTS.—Never enter a sick room in a state of perspiration, as the moment you become cool your pores absorb. Do not approach contagious diseases with an empty stomach; nor sit between the sick and the fire, because the heat attracts the thin vapor.

COAL MINING.—Statistics of the Pennsylvania coal trade for the present season show an aggregate production of nearly 5,000,000 tons, against less than three and three-quarter millions to the same time last year.

THE "IRONSIDES" AT FORT SUMTER.—The manner in which the armor of the *Ironsides* has thrown off the rebel shot causes general satisfaction, though she has not yet been closer than 1,800 yards to the rebel batteries. Most of the heavy shot have crumbled to pieces on her solid sides, and the rifled shot have only made indentations without doing the slightest damage. She has received two 10-inch shot on her port stoppers, and even there they only made indentations without doing any harm to them. The steel-pointed shot have made cuts about an inch deep. She will, however, be tested within 800 yards when the great assault is made.

GRAPES AND MUSHROOMS.—It is a curious coincidence that when the vine disease appeared the common eatable mushrooms entirely disappeared. In the districts of Maçon, Lyons, and the banks of the Rhone, which were great sufferers from the oïdium, this vegetable has again appeared. Whether there is really any relation between the reappearance of the one and the disappearance of the other, remains to be seen; but it is not unnatural that the vine-growers should believe and be fully convinced that there is.

ABUNDANCE OF PRAIRIE CHICKENS.—The *Dubuque Times* says that "never since Iowa has been settled by the white man, have prairie chickens been as numerous as at the present season. In Buchanan and Blackhawk counties, they can be killed with stones and clubs; and hunting them with guns is next to no sport at all. So plenty are they that the farmers importune hunters to try their luck on their grounds; and in some instances they have manifested a willingness to pay for the killing."

NEARLY every gate in the city of Vicksburg is now adorned with an unexploded 13-inch shell, placed on the top of each post. The porches and piazzas also (nearly every house has one) are ornamented with curious collections of shot and shell, which fell on their premises during the bombardment of the city by the Federal forces.

THE greatest capture of men related in modern history, is that of Napoleon at Austerlitz, where he took 20,000 prisoners. Gen. Grant at Vicksburg, took 31,000. The spoil at Austerlitz was 150 pieces of artillery; that at Vicksburg is set down at 238.

A VIADUCT for foot passengers is to be built over Ludgate Hill, London, a crowded thoroughfare. Why not build a similar arrangement over South and Water streets, in this city, to enable people to get to the ferries?

THE difference between rising at 5 and 7 o'clock in the morning, for the space of 40 years, supposing a man to go to bed at the same time at night, is nearly equivalent to the addition of ten years to a man's life.

ADVICES from Labrador state that the fisheries on that coast, both for cod and salmon, have been unusually successful. There are, however, but few American vessels on the ground.

A PIANO, four feet long, nineteen inches deep, and three feet four inches high, with a compass of seven octaves and a full rich tone, has been introduced into London, and is sold at less than a hundred dollars.

IMMENSE guns for the New York harbor fortifications are constantly arriving from Pittsburgh. The forts will not lack armament, whatever may be other delays or deficiencies.

LONDON streets are in a very crowded condition. St. Swithin's Lane was blocked up for eight hours and ten minutes, out of ten hours, on three specified days.

THE Woolwich Select Committee have discarded cast-iron altogether, as a material for rifled guns. They recommend coating shot for rifled guns with lead.

THE *Wool Grower and Manufacturer*, San Francisco, Cal., states that hundreds of tons of coal are now furnished by the Mount Diablo coal mines.

THE French cavalry use scabbards which contract to half their length when the sword is withdrawn. How are they made?

TWO British forgers of Yankee greenbacks have been sentenced, one to 15 months hard labor, and the other to 4 years penal servitude.

## Improved Farm Gate.

There is nothing more annoying to individuals passing in and out of gates in the country, than the sagging or dropping of the end, so that it drags upon the ground, and cannot be opened at all unless the whole structure is lifted bodily up. This defect has been remarked by every observing person; and the evils arising from it are not confined to the mere inconvenience of it. When a gate sags in this manner, it is hardly ever shut, and allows a free entrance to all animals astray upon the highway. Many a promising crop of corn, and garden patches generally, have been ruined by leaving the gate open; for which neglect there was always the excuse that "it wouldn't shut;" in too many cases literally true. An enterprising inventor at the West, deeming that the shiftless method of hanging a gate on hinges, and leaving it to sustain itself, had gone quite far enough, has devised the self-sustaining gate here-with illustrated. It will be seen that the body of the gate is very strong, as also are the posts to which the hinges are connected. To the bottom of these latter there is fastened a cast-iron shoe, A, in which the foot of the diagonal brace, B, sits; the top of this brace has also a cast-iron head upon it, over which the tie rod, C, passes, the opposite end being secured to the main post

by a nut and washer. From the head of the diagonal brace a second tie rod, D, proceeds to a second brace, E, the upper end of which fits in a casting let into the upper rail, while a third tie rod, F, connects with the outer rail, G. The plan of this gate, and its advantages, are so apparent to the observer as to leave little margin for an explanation. From the construction of the braces and the arrangement of them and the tie rods, it will be seen that the weight of the gate is wholly supported by the hinges, and through them by the large stone or wooden post, H; the first series of braces and the rods constituting a literal derrick (such as is used for hoisting heavy weights), and thereby affording a reliable support to the whole structure. Provision is made in the nuts on the ends of the rods for bracing the gate anew, whenever it may have been racked or strained by the weather or bad usage. There is no reason why this gate, if well made, should not do all that is claimed for it, completely obviating the objections existing against ordinary gates, and furnishing a safe, sure, and easily operated means of closing entrances about farms or residences. Small gates are readily made upon the same plan, but do not require more than one diagonal brace; an elevation of a small gate may be seen on the right of the engraving.

Patented through the Scientific American Patent Agency, on June 30th, 1863, by William C. Herider, of Miamitown, Ohio. For further information address the inventor at that place.

## MILES'S WAGON STAKE.

The light castings and fastenings represented in the accompanying engravings, are those recently invented by O. E. Miles, for a new and improved wagon stake. The inventor informs us that many persons are using them, who assure him that these stakes save in iron work on every set used, and give better satisfaction than others of the ordinary kind.

The usual mode of constructing the main uprights, and securing them to the bolsters of wagons, is probably so familiar to most of our readers as not to attract their particular attention. Wooden stakes, or standards, are mortised through the bolsters at their ends (thus greatly weakening them), and are secured thereto by several wrought-iron braces which are attached by bolts and rivets. Besides these, a band is usually required around the end of the bol-

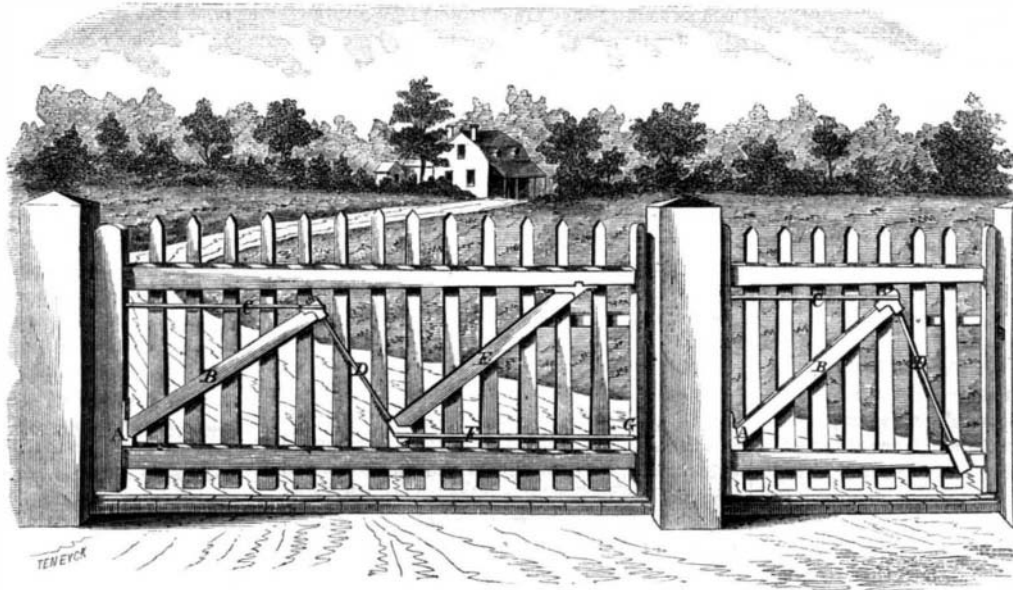
ster, to prevent it from splitting. All this, from its complicated nature, is expensive and troublesome; and if the parts are broken, a very expensive job of repairing is involved.

This improved stake, as will be seen by the engraving, Fig. 1, has a body, A, with a foot, *a a' e*, having a shouldered recess in its under side, which, when the bolster, B, is dressed to a proper form, and the end rounded to a compass mark, is easily and quickly fitted thereto so as to be secure against slipping, either endwise or laterally. The flange, *e*, on the under edge keeps the stake in position, laterally, and prevents water from getting under the casting; while the part, *a'*, of the foot is let into the bolster,

means. Such an adjustment or substitution is beyond the skill of the most intelligent wagoners, with the ordinary mode of construction.

Another feature of this stake, which makes it superior to the ordinary kind, is the socket, *f*, with which it terminates at its upper end, furnishing an ever-ready means of lengthening it to any height desired, by the insertion of a suitable extension piece, which may be a simple wooden bar. This is found necessary when very bulky loads are carried, such as rails, sugar-cane, &c. The opening, *g*, admits a key to confine the top stake if desired.

Many wagons are now constructed with an extra box, to be used on the top of the other when the loading requires it. This upper box is ordinarily secured to the lower one by cleats screwed to the upper one, and passing through staples inserted in the lower box. These cleats and staples are very liable to get out of repair. With this invention a set of extra stakes may be screwed to the upper box with their lower ends fitting into these sockets, *f*. And a further use for these sockets, the inventor, writes, will be found when we come to celebrate the re-establishment of the authority of our Government, "what convenient places they will be to set our flag staffs, carrying, if we choose, four at once."



HERIDER'S PATENT FARM GATE.

as indicated by the dotted line, so as to hold the casting very firmly against slipping endwise. The casting is held down by a clip and bolt, the clip, *c*, passing around the under side of the bolster, B, and up through the foot, *a*, on each side, secured by nuts. A countersunk bolt also passes down through *a'*, having a nut, *d*, on the under side of the bolster.

This structure is so shaped and applied as to se-

Fig. 2 represents a modified form of this stake, intended for trucks and sleds for drawing logs, &c. The foot and fastenings are the same as Fig. 1, with a simple rectangular socket, four inches in height, which admits of a log being easily rolled over it. This casting receives a wooden stake, of suitable form and of any desired height.

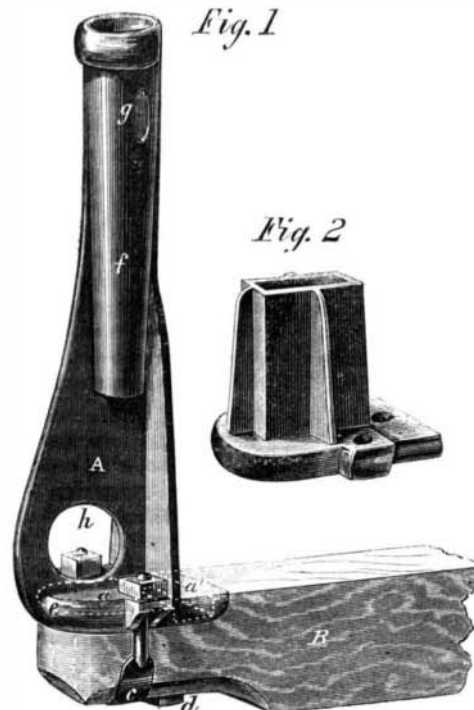
Further information may be had concerning this device, by addressing the inventor, O. E. Miles, at Aurora, Ill., who has taken steps to secure a patent.

## A Tremendous Shock.

Dr. Jerome Kidder, of New York, has lately enjoyed the happiness of receiving, with perfect safety, a shock of electricity sufficient, according to the previous ideas of scientific people, to kill fifty men. The experiment took place at the Cooper Institute, under the direction of the eminent Professor Van der Wede, of that institution. The battery consisted of six of the large Bunsen cups and a Ruhmkorff coil, of sixteen miles of wire, made by E. S. Ritchie, of Boston—one of the best makers in the country. A most formidable battery truly! The New York Tribune states that Dr. Kidder had observed that the longer the wire was used the greater the tension, and consequently the greater the ease with which the current is conducted through the body. Hence he argued that the enormous length of the wire in the Ruhmkorff coil must render the current so highly conductible that, in spite of its great power, it would not lacerate the tissues of the body. He staked his life on his opinion and won it.

## Force of Habit.

As an instance of the force of habit, a lady remarked to us the other day that so accustomed was she to wearing her thimble when sewing, that she now never sits down to her sewing-machine without putting it on, although it is of no service to her in the management of the machine. Her finger does not feel right without it. Yet, notwithstanding the power of habit, this little implement seems in danger of going out of use, along with the bellows, the fire-dogs, tinder boxes, and many other familiar articles of domestic use now superseded by similar invention. All sorts of sewing are done by machinery; and the time will come when the needle and thimble will be as little seen in the hands of women as the staff and the spindle now are.



cure the necessary strength and stiffness with these simple fastenings; and it is claimed that it weighs even less than the ordinary wooden stake with its wrought-iron work attached.

The opening seen at *h* furnishes convenient means for securing a binding rope when one is used. In case of this stake getting loose by the shrinkage of the bolster, it may be tightened with the greatest facility by an ordinary wrench. In the event of one getting broken, a new one, previously provided at slight expense, may be substituted by the same simple