Atmospheric Changes at Nice.

Since the appearance of the brilliant sunsets, Messrs. Thollon and Perrotin have noticed that the sky at Nice seems to have lost much of its ordinary transparency. They have been accustomed, on every fair day, to examine the sky in the neighborhood of the sun, placing themselves near the border of the shadow projected by one of the observatory buildings. When thus sheltered from the direct rays of the sun, they have noticed in former years that the blue of the sky continued to the very borders of the solar disk. If they were so placed that the disk was almost a tangent to the border of the screen, but still invisible, no increase in the brilliancy of illumination indicated the place where the point of tangency would be found. This is now no longer the case. Since the month of November, even upon the brightest days, the sun appears constantly surrounded by a circular fringe of dazzling white light, slightly tinged with red at its outer edge, and with blue on the inner edge. There is a sort of ill-defined corona, with an apparent radius of about fifteen degrees. It would be interesting to know whether this fact is general, and whether it can be considered as connected with the volcanic dust or other causes of the late brilliant twilights.—*Chron. Industr.*

PORTABLE BARN.

The frame of the barn is formed of transverse sections, each of which is composed of a center post and two side posts, united by horizontal bars. The central top beam is mortised to fit tenons on the center posts, and its ends project beyond the frame, and are provided with short standards in which a long roller is journaled. The roller is turned by a pulley at one end. A piece of sail cloth, rubber, or other suitable material is secured at its middle to the roller. At the top of each side post is a notched bracket, in which the side top bars, which also project beyond the ends of the frame, are held. In the ends of the bars are journaled end rollers, each of which has a pulley and a piece of cloth attached to it.

KEYS & SLAUGHTER'S PORTABLE BARN.

A portable barn made after this plan can be erected or taken down very easily and quickly, and folded very compactly for transportation.

This invention has been patented by Messrs. B. C. Keys and A. J. Slaughter, of Murray, Ky.

Sewerage for a Town of 10,000.

The town of East Orange, N. J., population about 10,000, has lately introduced water, and is now about to put in a sewerage system. The water consumption is 300,000 gallons daily, and that is the estimated amount of sewerage to be disposed of. As this is an inland town, surrounded by several other cities, without communication with the sea, it is necessary to adopt some local method for the disposal of sewage. The engineer, Mr. J. J. R. Croes, has advised the sawdust filtration system, using the Farquhar-Oldham filter, with the addition of a small percentage of perchloride of iron. The peculiar construction of this filter will be seen by reference to the illustration in SCIENTIFIC AMERICAN SUPPLEMENT, No. 291.

The plan recommended includes a tight masonry receiving tank at the outlet, and a steam pump to lift the sewage 20 feet above the filter into another tank, where the perchloride of iron is added to deodorize the sewage; the discharge from the filter is clear and harmless.

To purify 100,000 gallons of sewage per day the tank and pumps are estimated to cost $3,000, and a filter, 8 feet in diameter, $3,000; 5 gallons of perchloride of iron, costing $1.50, and 60 cubic feet of sawdust would be required daily.

To purify 300,000 gallons per day the cost would probably be $15,000 for plant; the labor in both cases is estimated at $5 per day. The preparation of land for receiving the filtrated sewage and transmitting it to the streams would cost about $350 per acre; three acres of ground would suffice for the present demands of East Orange. Sub-surface irrigation, by laying a network of tile drains 10 inches under ground, would cost $2,000 per acre.

The approximate estimate for the entire sewerage of East Orange, as submitted by Mr. Croes, is $329,860, though much of this work would not be needed for some years.

Rain water is to be excluded. The estimate covers the laying of 40 miles of stoneware sewer pipes, calked with oakum and packed with cement.

SPRING SEAT FOR WAGONS.

The illustration herewith represents a way of holding wagon seat and similar springs in place, to prevent them from canting over when the wagon tips on sidehills or in passing over obstructions. The bars on which the ends of the seat rest are loosely connected with a stay bar, the latter passing down through keepers in the frame on which the springs rest, and also through keepers in the cross piece below. The bars on which the seat rests are rounded, and the stay bar is bent at the end below the cross piece to prevent its being withdrawn from its keepers. The loose connection between the stay bars and the bars on which the seat rests, with the rounding of the latter, tends to prevent the stay bars from being broken, while allowing the seat to move sufficiently in a lateral direction to ride easily over rough roads.

For further information relative to the patent which has been granted on this seat, address Mr. John Hodgess, Loyalton, Cal.

What Next?

The *Mechanical World* (London) makes the following invidious remarks respecting an American invention:

The resources of inventive genius are not yet exhausted in the United States, the writer truthfully remarks, and then he proceeds to say that some one who has probably heard somebody's grandfather remark that it is much more economical to supply boiler furnaces with heated air in preference to air under ordinary atmospheric conditions, has conceived the idea of heating the air before going to the furnaces by first passing it round the steam dome of the boiler. This is about the latest development we have met with of the notion of robbing Peter to pay Paul, and reminds one of the story of the four persons who went on an excursion and played cards all the way with such good luck all round that each one made his expenses for the outing. Probably the inventor has not reflected that if air be heated from 32° Fah. to 512° Fah. no chemical change would be effected, but its *bulk* would be doubled, and he would require to send twice the volume of air through his furnaces to burn the same amount of fuel. For example, if the oxygen of 300,000 cubic feet at atmospheric temperature be required for the combustion of one ton of coal, it would require that of 600,000 cubic feet if raised to 512°, a volume which, as C. Wye Williams points out, no natural draught would be equal to. Sir Humphry Davy tells us that by heating *gases* strongly which burn with difficulty the continued inflammation becomes easy, so that we have his testimony in favor of heating the *gas* rather than the air, and although he did not try the effect of heating the air and thus expanding it, he tried the effect of *condensing* it, and he ascertained that both "the light and heat of the flames of sulphur and hydrogen were increased in air condensed four times." But then Humphry Davy lived some time ago and is old-fashioned, and we shall expect next to hear that some other aspiring genius will have taken out a patent for heating the air by passing round the whole boiler before going to the furnace. Probably the best results will ultimately be obtained by combustion under pressure with heated air, for it is certainly true that the air must be heated before it combines with the fuel. How to do this successfully before passing the grate bars has yet to be solved.

The Mosquito's Instrument of Torture.

A writer in the London *Sportsman* thus describes a mosquito as seen under a microscope:

It appears that in the "bill" of the little beast alone there are no fewer than five distinct surgical instruments. These are described as a lance, two neat saws, a suction pump, and a small Corliss engine. It appears that when a "skeeter" settles down to his work upon a nice tender portion of the human frame the lance is first pushed into the flesh, then the two saws, placed back to back, begin to work up and down to enlarge the hole, then the pump is inserted, and the victim's blood is siphoned up to the reservoirs carried behind, and finally, to complete the cruelty of the performance, the wretch drops a quantity of poison into the wound to keep it irritated. Then the diminitive fiend takes a fly around just to digest your gore, and makes tracks for a fresh victim, or if the first has been of unusual good quality he returns to the same happy hunting ground. The mosquito's marvelous energy, combined with his portable operating chest, make him at once a terror and a pest.

Changeable Signs.

Make a wooden sign in the usual manner, and have a projecting moulding around it that projects one inch out from the face of the sign; now cut thin grooves into the moulding, one inch apart, allowing each cut to reach to the surface of the sign; in each of these grooves insert strips of tin, one inch wide, and long enough to reach across the signboard; when so arranged take out the strips of tin, and place them

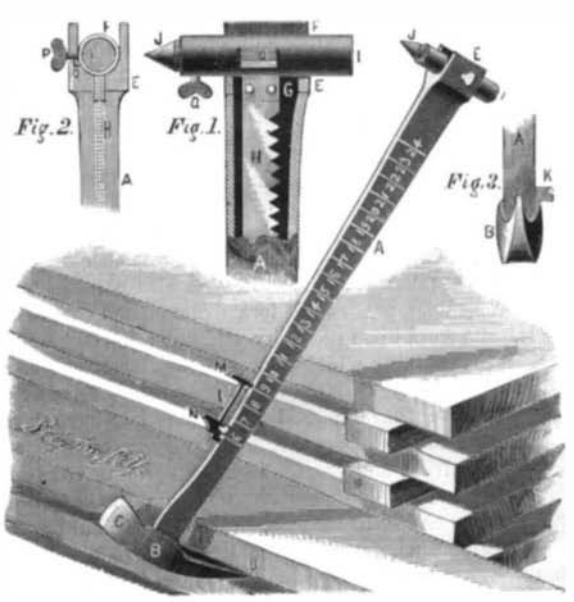
HODGESS' SPRING SEAT FOR WAGONS.

edge to edge on a level surface; paint any desired words on their united surface; when dry, reverse them and paint other words on the other side; now finish your lettering as usual on the signboard, and put the thin strips in correct order in the grooves; this will complete a sign that will read three different ways.

LUMBER GRADER'S COMBINATION TOOL.

Upon the lower end of a handle made of strong, tough wood is fitted a steel head, B, provided at one end with an ax blade and at the other with a canter, which is inclined toward the handle and has a chisel edge end. The other end of the handle is squared and is fitted with a metal band, across which and the end of the handle is formed a groove, from the bottom of which extends a recess into the handle. Fitting in the recess is a saw blade, H, provided with a tubular handle, F, that fits in the groove. At one end of the saw handle is a thumbscrew for holding a lumber lead, J, in place. At the center of one side of the handle is a flange, O, above which rests a thumbscrew in the band to hold the saw in place. Near the head upon one side of the handle, A, is a stud, K (Fig. 3), and upon the other side is a scale of inches. Upon one edge of this handle is placed a thickness gauge, consisting of a bar, L, having two prongs adapted to be driven into the handle, and having a finger, M, projecting upward from one end. Sliding upon the bar is a finger provided with a thumbscrew. Fig. 2 is a section through Fig. 1.

With this tool the grader need not stop to turn the lumber, as by entering the canter point beneath the board it can be



CALL'S LUMBER GRADER'S COMBINATION TOOL.

easily turned up for inspection. He can always stand over the center cross pieces of the pile of lumber, from which position the lumber can be easily handled. Frozen boards can be separated by a sharp rap with the point, D, at one corner of and between the boards. The gauge is for trying the thickness of the lumber, and may be set to any desired fraction of an inch. By placing the stud against one edge of a board, the width can be seen at a glance. The saw is convenient for trimming off the ends of boards, and the ax for chopping off ice and trimming off the stubs short.

Further particulars regarding this handy tool may be obtained by addressing the inventor, Mr. Jamas F. Call, of Clear Lake, Wis