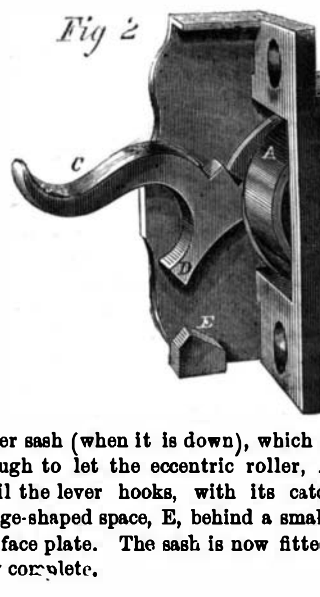
Improved Window-sash Supporter.

So many devices for supporting window-sashes have been brought before the public, that it seemed to be almost an impossibility to produce anything new in that line; and yet in the accompanying engravings we have the representation of one which is both novel and useful. It consists of a small cast-metal box, having an eccentric section-roller, and lever-catch; the roller being set in the run or jamb of the sash, and operated by the lever to lock the window in the desired position.

Fig. 1 is a front view of a window, showing a sash supporter in section, secured to the case for the upper sash; and another is shown secured in the case for the lower sash. A description of one will suffice for both; and a perspective view—nearly full size—is given of the supporter in Fig. 2.

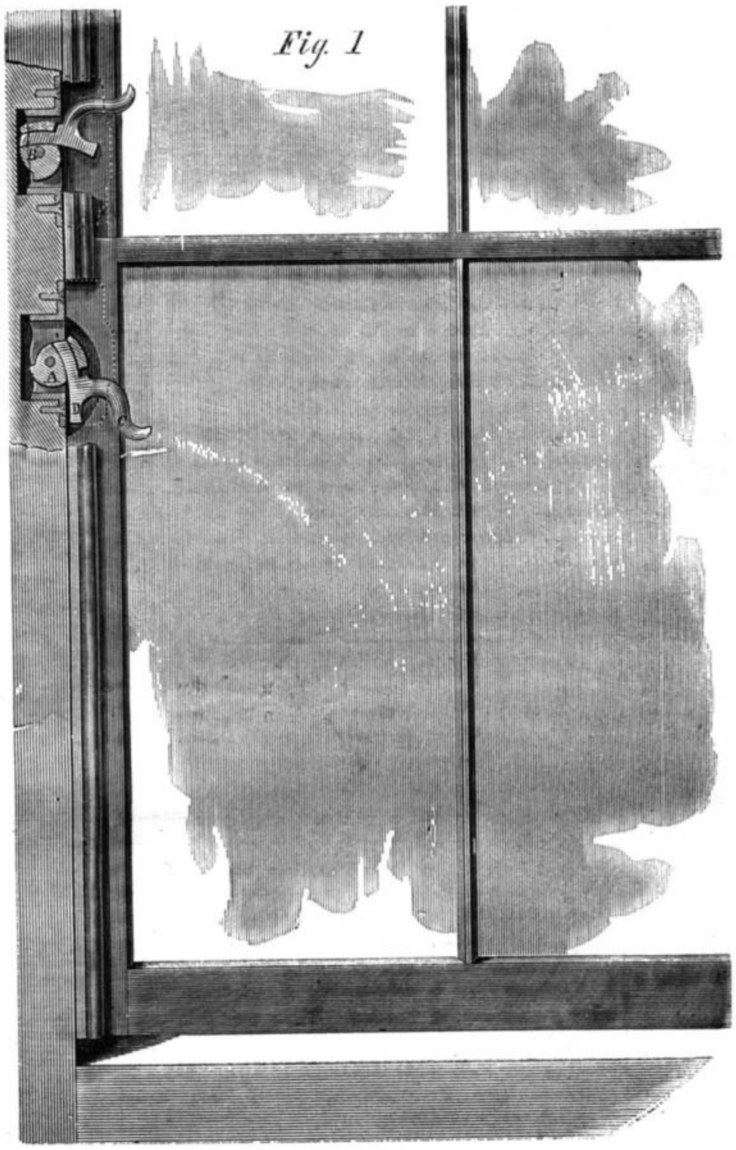
The small box of the sash-supporter is let into the case, in the jamb of the case, and fastened with screws, as shown in Fig. 1. A is its small section eccentric roller, secured on the pivot, B, and C is its adjustable lever-handle, passing into a slot in the edge of the roller. This lever has a catch, D, upon it, which is pushed into the wedge-shaped space, E, in the face-plate of the box, and serves to lock the sash in the position desired, by preventing the eccentric roller from being turned.

When the lower sash is down, the lever, C, is turned down, so as to bring its catch, D, into the wedge space, E, which prevents the roller from moving, and the window is locked, as shown by the lower sash in Fig. 1. When it is desired to raise the window, the lever, C, is slightly pushed into its slot, thus relieving the eccentric roller; the sash is then raised, the roller, turning as it is elevated, and the window is held in any position, by the bearing against the sash-edge. The upper sash is operated in a manner similar to the lower one; and the window is locked securely, so that it cannot be opened from the outside even when the upper sash is left partly down; thus securing ventilation, while the window is locked. No notches are required in the style of the sash; and any man who can use a mallet and chisel, can put it on a window. It is only necessary to make a mortice in the left jamb of the window-case, for the upper sash, about three inches above; and one for the lower sash about three inches below the meeting rail; the flanges of the sash-supporter are then let in flush with the face of the jamb. About one-fourth of an inch is cut out of the window-strip, so as to fit over the face-plate; and a half-circle notch is made in the style of the



lower sash (when it is down), which is cut just deep enough to let the eccentric roller, A, turn down, until the lever hooks, with its catch, D, into the wedge-shaped space, E, behind a small projection on the face plate. The sash is now fitted, and the window complete.

The patent for this sash supporter was issued on April 21, 1863. For further information respecting it address Messrs. McLean and Campbell, No. 112 Wood street, Pittsburgh, Pa.



M'LEAN'S WINDOW-SASH SUPPORTER.

CAUSES OF ANIMAL HEAT.

The following extracts on a most interesting subject, are from a lecture delivered before the Royal College of Surgeons, England, by George Gulliver, F. R. S:—

"Soon after the discovery of oxygen by Priestley, in 1774, the very time of Hewson's death, just a century after the publication at Oxford of Mayow's tract, and seventeen years subsequent to the discovery of carbonic acid by the eminent Dr. Black, a consistent, or at least plausible, theory was formed on the subject. Black observed that carbonic acid is produced during respiration and combustion; and the chemical theory of the cause of animal heat made rapid progress. In short, that respiration was essentially a combustion of carbon, which combined in the lungs with oxygen, and formed carbonic acid, and at the same time produced animal heat, was the prevailing doctrine—indeed, the exclusive one on the subject. And no wonder, seeing that this conclusion was supported on the Continent by such eminent authorities as Lavoisier and Laplace, and in Britain by Black and Crawford. Recently, even Liebig, like some old writers, seems to maintain the same view, when he attributes animal heat to the burning of the carbonaceous part of the food, especially fatty matter, in the lungs.

"But a host of experiments and observations, in our day and before, show that the blood in the lungs cannot be the center or furnace for the production of all the animal heat; whatever may be the importance of the blood as a carrier of support and fuel for the combustion and other chemical changes concerned in the production of that heat. Mr. Hunter, Sir Benjamin Brodie, and Mr. Cæsar Hawkins, have given conclusive evidence, that respiration in the human subject may be preternaturally slow or imperfect, while the body is acquiring and maintaining a preternatural heat; and it is well known to practical surgeons, that the limb in which the artery has been tied for the cure of aneurism, may be for a while hotter than the other limb, which is still receiving its usual supply of arterial blood. That arterial blood is warmer by one or two degrees than venous blood, has been clearly established by Dr. Davy. He has proved that blood acquires heat in passing through the lungs—in other words, that the blood of the left ventricle is hotter than the blood of the right ventricle in the living body; the difference of temperature being from 1° to 1°.5 of a degree: a like difference existing between the blood of the veins and arteries, though somewhat diminishing as their distance from the heart increases. He has further shown that venous blood, agitated in a bottle with oxygen, acquires an increased heat of about 1°, and this, by combining with the oxygen, without the production, or at least evolution, of any carbonic acid. Hence, he infers that animal heat is caused by the fixation and condensation of oxygen in the blood: by its conversion from venous to arterial blood in the lungs: and by combination of this oxygen in its course through the body, in connection with secretion and other changes.

"Ludwig and Spiess found the temperature of the saliva, which flows when the nerves of the submaxillary gland are galvanized, 1° 8′ higher than the blood of the carotid artery of the same side; and they conclude that the work of secretion produces a notable increase of temperature, with a diminution in the formation of carbonic acid: the venous blood of the gland being almost as red as arterial blood. Nay, further, we have well-attested cases of an actual rise of temperature in the human body, unconnected with putrefaction, during the first hours after death; and, therefore, quite independently of the immediate agency of the nervous and respiratory functions. Dr. Bennett Dowler, of New Orleans, has reported cases of this kind in bodies dead from cholera, yellow fever, and sun-stroke; and though Dr. Davy, in his excellent work on 'Diseases of the Army,' has some doubts about these results, they have been confirmed, as far as regards cholera subjects, by M. Doyère, in Paris. But now, within our own immediate knowledge, thanks to the interesting experiments conducted by Dr. Sclater and Mr. Bartlett, we have the great female python at the Zoölogical Gardens, producing and maintaining a great increase of temperature during the act of incubation; and this, without taking any sort of food for upwards of a month. It would be curious to know how Professor Liebig would attempt to reconcile these unquestionable facts with his theory. Certain it is that here there has been no food or fuel put into the reservoir of the stomach, to be burned up for heat in the lungs, during this remarkable elevation and maintenance of temperature in the body. In short, animal heat is certainly produced elsewhere than in the lungs, whatever heat may be generated there, and however important they may be as receptacles for the elaboration of materials, to be distributed to initiate or assist in the chemical processes for the production and maintenance of that heat throughout the body.

"Sir Benjamin Brodie has made experiments which furnish proof that the nervous system is necessary to the production of heat. He removed the brains of several dogs and rabbits, and after having duly secured the arteries of the neck, and maintained the action of the heart thereafter for two or three hours, the bodies were found to cool even faster than the bodies of other animals killed at the commencement of the experiment, and laid in the same room for comparison. Yet the blood of these decapitated animals, thus made to breathe artificially, underwent the usual changes, just as in a living animal. The dark venous blood acquired the florid arterial hue in its passage through the lungs; as usual, too, oxygen was absorbed and carbonic acid evolved. Allowing for all possible errors in the observations and calculations, here was sufficient experimental proof that the then universal doctrine of all animal heat being produced in the lungs, must be abandoned. That specious and beautiful theory, so beloved by its authors, so long and fondly admired and cherished by those who had embraced it, had to be discarded. And so the conclusion becomes irresistible, that animal heat—whatever share the oxidation of the blood in the lungs may have in its production there, and some share it would appear to possess—must be generated elsewhere in the body. This is just what all the best subsequent and independent observations have peremptorily proved. Indeed, with these observations—and especially the experimental researches of Dr. Davy, which attribute the generation of a large share of animal heat, and different chemical processes in other parts of the body besides the lungs, to the consumption or agency of oxygen—Sir Benjamin Brodie's experimental results have always appeared to be in concord. Chemical changes, therefore, so far as they are dependant on the organic functions, in vertebrate animals, are under the presidency of the nervous system, or at least some part of that system."

THE MANUFACTURE OF CHEESE.

We were lately informed by a very intelligent farmer of northern New York, that the manufacture of cheese, when properly conducted, was a very profitable business; "but," he added, "there's more bad cheese than bad butter made, and there's more than enough of that." For some years past large quantities of the best American cheese have found a ready sale in Great Britain; in some sections of which cheese is used to a great extent as an article of daily food by both rich and poor. We have been credibly informed that almost all the best American cheese is exported—the inferior qualities being kept for home use. A few remarks on the subject will not be unprofitable at present, as this is the season when most of our farmers set about making cheese.

The principal substances in milk are the fatty butter parts—milk-sugar and casein. The latter is really the cheesy part; but cheese of the best quality likewise contains a considerable portion of the butter, and some milk-sugar. The cheesy portion of milk is separated from the liquid by coagulation—a chemical operation, which is performed to-day as it was hundreds of years ago. The mode of producing this result was undoubtedly an accidental discovery. It consists in stuffing the stomach of a sucking calf, an unweaned lamb, or a kid, with salt, and suspending it in a dry situation for several months. This prepared stomach, called the *rennet*, when steeped in water, produces a decoction which possesses the power of thickening milk—decomposing it, and separating the casein from the liquid or whey. The most convenient way to prepare the rennet for use is to place the stomach in a stone-ware jar with two handsful of salt; pour about three quarts of cold water over it, and allow the whole to stand for five days; then strain and put it into bottles. A tablespoonful will coagulate about 30 gallons of milk.

The milk of which cheese is made, is heated to about 90° Fah. To every 30 gallons, a tablespoonful of the rennet is added and stirred. In from fifteen to sixty minutes the milk becomes coagulated—the casein separating in a thick mass. The rennet possesses the chemical property of producing lactic acid, by acting upon the sugar in the milk. The acid unites with the soda in the milk, which holds the casein in solution; when the casein, which is insoluble, separates, forming the curd.

The quality of cheese depends chiefly upon the milk of which it is made; the best containing a considerable portion of the constituents of butter. The Stilton cheese of England, and the Brie cheese of France, have a world-wide reputation; and are made from fresh sweet milk, mixed with cream, skimmed from milk of the preceding evening. The Cheshire, double-Gloucester, Cheddar, Wiltshire and Dunlop cheese of Great Britain is made of sweet unskimmed milk; as is also the best Holland and American cheese. It is frequently made from milk obtained at two separate times, though it is believed that the best cheese is made from that procured at one milking; as it is supposed that cream, which becomes separated from cold milk after standing several hours, cannot be intimately mixed with the milk again; and that much of it will be removed with the whey. This is a very important consideration for those engaged in the production of cheese.

Skim milk yields nearly as much cheese as sweet milk, as it contains all the casein. The Dutch, the Leyden, and the hard cheese of Essex and Sussex counties, in England, are made of milk thrice skimmed. They are excellent for sharpening the teeth, and would try the temper of a good American axe.

In making cheese, a thermometer should always be used to test the heat of the milk, which should never be raised above 95° Fah., otherwise the curd will be hard and tough. If the milk is cold—much below 90° Fah.—the curd will be too soft, and difficult to free from the whey. Perhaps the best and safest way to heat the milk is in a tin vessel, placed in a cauldron of water heated to 95°, to which temperature the milk should be raised before the rennet is added. Whenever the milk is fully coagulated, the whey should be strained from it. In Cheshire—famous for its cheese—great attention is paid to the removal of the whey: which is done very slowly, and with slight pressure until the curd is pretty hard; the latter is then cut fine in a machine, and prepared for the press. The curd of the celebrated Stilton cheese is not cut at all; it is pressed very gently till all the whey drains out, so as to retain all the butter in it. In Belgium, a rich cheese is made by adding half an ounce of butter and the yolk of an egg to every pound of cut curd. About an ounce of the best salt is mixed with every two pounds of the cut curd, which is then placed in a cloth, secured in the cheese-hoop, and submitted to pressure. The quality of cheese depends on having all the whey pressed out; to do which it is turned upside-down several times, and allowed to remain in the press until no more whey can be got out of it. Cheese when taken from the press should be rubbed over the entire surface with good butter, and placed in a cool, airy room, upon a smooth, flat stone, or polished slab of marble, if possible. It requires to be examined and turned, daily, for some weeks afterwards, and occasionally rubbed with butter. Annatto is frequently employed to color the outside of cheese, but this is a practice which ought to be condemned. Cheese of an inferior quality may be inoculated to some extent with the flavor of any rich cheese, by introducing a small portion of the latter into the interior of the former with a common cheese scoop. Old cheese sells in England at several cents per pound higher than new cheese. It acquires by age that peculiarly sharp pungent taste so pleasing to the palate of the Britisher.

Railway Curves.

The following communication has been addressed to one of the London papers, by Mr. William Bridges Adams, the distinguished practical engineer and writer on mechanical subjects:—

On railway curves it is a practice to elevate the outer rail above the inner one, with a view to balance the centrifugal force by gravitation,—a practice that obtained on the highway curves in the old coaching days of high speeds, and which still obtains in the sharp curves of the amphitheater, where both horse and rider lean over towards the center at an angle corresponding to the speed.

But in the old coaching days the wheels on either side were enabled to vary their speed to suit the length of the curves they described, and the inner wheels made fewer revolutions than the outer. So, also, it will be found in the amphitheater that the inner legs of the horse make shorter strides than the outer. Otherwise the animal would be driven against the barrier—his leaning inwards notwithstanding.

On a railway, wheels proper, *i. e.*, revolving independently of each other on the same axle, are not used, but there is a contrivance intended to produce a compensation, The periphery of each wheel is coned, or has a varying diameter, largest internally, and smallest externally. Theory says that the centrifugal force tends to drive the wheels against the outer rail, and so bring the larger diameters into action thereon, and the smaller diameters into action on the inner rail, thus producing compensation and curvilinear movement.

But theories are not sound when they do not take into account all the data which may affect them. If the play or width between the rails, *i. e.*, the gages, be not wide enough for endlong movement of the axle, this conic compensation is defeated. And, if the axle be so fixed in a long carriage or engine that, while going round a curve, it cannot point to the center of that curve, the compensation will be imperfect. The actual condition on almost every curved line, whether the proposed curves of the engineer, or the multiplicity of short and sudden curvatures and variations of rail surface induced by wear or imperfect workmanship—the actual condition involves both the defects—wrong position of the axle, and wrong diameter of the wheel.

The result is that the wheels become, not rollers, but sledges; and induce that grinding vibration which physicians object to for their nervous patients, and the existence of which is ignored frequently by those said to be experts.

The proof—centrifugal force and inward gravitation are nicely calculated and balanced by engineers to determine the exact elevation of the outer rail above the inner due to each curve. Theoretically, the weight of the engine leaning inwards should tend to grind the inner rail, but the exact opposite is the constant fact. The inner edge of the outer rail is ground away and polished, even when on a curve of 600 feet radius; the outer rail is elevated 6 inches—equal to an incline of one in nine.

The mechanical reason for this is that the inner wheels, running in diameters too large for the path of the inner rail, are acting with an outward thrust that wholly overpowers the gravitation inwards: that very gravitation tending to increase the bite or adhesion of the inner wheels, and to force the lighter loaded outer wheels to "skid," and slip against the outer rail with a force tending to burst the fastenings by the flange action. If, under these circumstances, there be a yielding or sinking of the inner rail, the adhesion of the inner leading wheel will be lessened, and the flange force of the outer wheel will be increased, tending to throw the engine off internally. If, on the contrary, there be a yielding or sinking of the outer rail, the flange force will be weakened, and the adhesive force of the inner wheel will tend to throw the engine off externally.

Other things being equal, the greater the length of the wheel base compared with its breadth, the steadier the engine will run on straight lines; but the greater will be the risk of its getting off the rails on curves, unless provision be made to keep the axles true to the curve centers, and to adjust the diameters of the wheels to the respective lengths of the rails.

Such provision is not made—is scarcely thought of being made—and as a general rule would be thought a heresy, would be objected to, and yet herein lies the whole of that "mystery" so frequently adverted to, as the solution not to be comprehended, when railway accidents occur, by engines getting off the line.

All railway practice is full of the proof. Why do rails glisten? Why do the treads of wheels work into deep hollows? Why are wheel flanges cut to the sharpness of knife-blades? All this is proof positive of sliding friction, and not of rolling.

And now to the proof negative. A resident railway engineer applied to four engines running on a line of sharp curves and steep gradients, four classes of tires of different qualities, varying in price from £72 per tun to £25 per tun, representing thereby their various degrees of durability. To three of the engines the wheels were applied on the usual mode with the best tires. To the other engine, working under far more unfavorable circumstances, the lowest class tires were applied, so that the wheels obtained compensation in curves. The result was that the inferior tires exhibited about two-and-a-half times the durability of the best. And, as action and