IMPROVED WINDOW FASTENER.

The annexed engraving represents a novel and simple device for fastening the sashes of windows at the meeting rails, so that said sashes cannot be raised or lowered by any one from the outside. The ordinary form of spring catch is after some use apt to work loose and to be freely movable, and it has often been opened by burglars introducing a thin steel blade between the rails and thus pushing it back. With the present invention this is impossible. The portion A, which is attached to the lower rail of the upper sash, has lugs in which is pivoted the tongue, B, which is acted upon by the leaf spring shown. This tongue may be turned up vertically, so as not to be in the way of raising or lowering either sash, and is retained in position by the action of the spring.

Pivoted in the portion of the device which is attached to

Fig. 1.

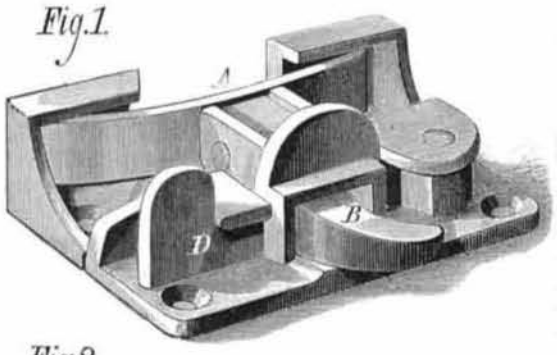
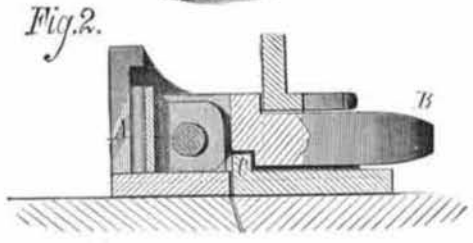


Fig. 2.



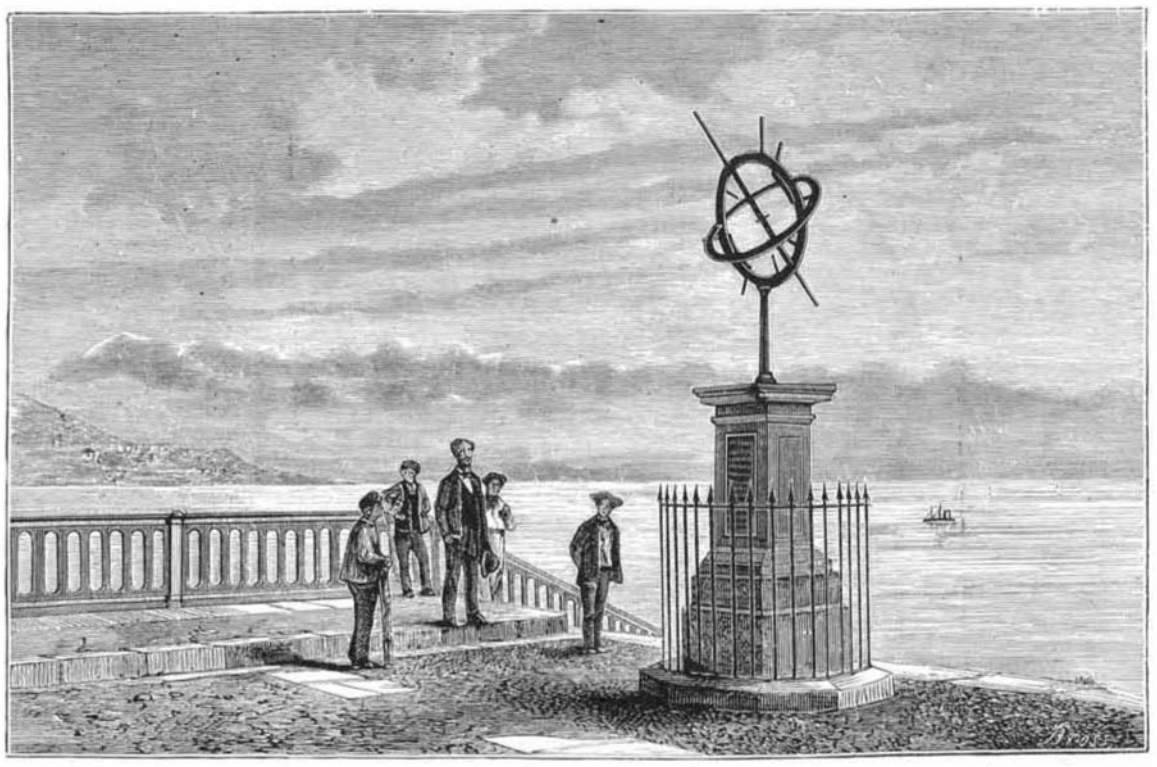
the upper rail of the lower sash is a spring clamp or catch, D. This has a recess which, when the tongue, B, is turned down, comes over said tongue, so that the same is thus prevented by the catch from rising or being moved sideways. A perspective view of the tongue thus secured is shown in Fig. 1 and a sectional view in Fig. 2. It will readily be seen that the device cannot possibly be tampered with by any one outside the window, as no tool can be introduced to reach and push back the catch, D. Patented September 4, 1877, through the Scientific American Patent Agency. For further particulars, address Clark & Smith, Chester, Orange county, N. Y.

THE COSMOGRAPH.

M. Riviere, of Marseilles, France, is to be credited with a capital idea for popularizing astronomical knowledge through the medium of a simple monument which may be set up in public squares, private grounds, or any other convenient locality. Several have already been erected in French cities, and our illustration, from *La Nature*, represents the one lately constructed at Nice.

The cosmograph, as the invention is called, shows, first, by a vertical circle, the plane of the meridian. A rod, directed toward the polar star, passes diametrically through the circle and shows the position of the earth's axis. A circle placed at right angles to the first indicates the plane of the equator. Of course the inclination of the axial rod varies according to the latitude of the locality. A small rod, placed vertically above the meridian circle, shows the zenith. Four other arms, fixed 23° above and below the equator, mark the tropics, and four more, placed at the same distance from the points of intersection of the axis, mark the polar circles. The graduation comprised between the tropics allows of the sun's movement in declination being followed, the solstices and equinoxes being observed, and the succession of seasons noted. The equator, divided into degrees and receiving the shadow of the axis, becomes a sun dial, an arc of 15° counting one hour. After a little practice it is easy to refer the curves of the cosmograph to the heavens, when the principal constellations may readily be found, especially those of the zodiac, through which passes the plane of the ecliptic or annual apparent path of the sun.

Inscriptions in relief show the names of the various portions of the instrument, and several useful astronomical facts and data are engraved on the pedestal.



THE COSMOGRAPH.

The Ventilation of Passenger Cars.

If the agitation of this subject during the past few years has not been productive of the best results that could have been desired, it has at least awakened public attention to the importance of car ventilation, and stimulated inventors in their efforts to devise more effective means for securing it. It is no very difficult matter to keep passenger cars tolerably well ventilated in summer, so far as the requisite supply of fresh air is concerned. An abundance of it can be introduced through open doors and windows, and by the ordinary roof ventilators—sufficient at least to disinfect or replace that which has been contaminated by breathing.

In winter, however, the conditions are very much changed. For at least seven months in the year, in this latitude, an artificial temperature, high enough for comfort, must be maintained, and this kind of comfort the great mass of railway travelers insist upon having. If good ventilation can be had along with it so much the better, but a chilly atmosphere and direct drafts from the outside must be avoided at all hazards. These tell at once upon the physical sensibilities, while the breathing of warm and impure air produces no immediate discomfort, nor does it excite any very great alarm with most people, even when headache, lassitude, and faintness supervene.

If the owners of a car can afford to line it with costly cabinet woods and showy trimmings, they can afford to furnish the occupants with the needed supply of pure air which surrounds it in a vast volume on every side and presses for admission.

Car builders in their discussions of this subject have attached, as it seems to us, an undue importance to a scientific analysis of the vitiated air in cars, as if there was any question about its deleterious qualities. Whether carbonic acid gas and the organic poisons, exhaled with the breath or discharged from the pores of the skin, go up or down, or are diffused through the car, or whether they will kill at ten paces or fifty paces, is not very material. They are in the car, and the essential thing is to get rid of them in a quiet, automatic sort of way, so that passengers will not know that it is being done. Under the conditions of winter ventilation, this can only be accomplished by a constant process of expulsion, and the introduction of a corresponding supply of warm and uncontaminated air. A car full of bad air will not go out unless an opportunity is afforded, and some of it will not go even then unless forced; and the necessary force or motive power must be derived from the speed of the train, or an inflowing current induced by rarefaction, or both combined.—*National Car Builder.*

Strength of Steel made without Blows.

At the recent meeting of the British Iron and Steel Institute, at Newcastle, England, a paper was read by M. Gautier relative to some remarkable experiments made with artillery produced from steel fabricated without blows, or, in other words, metal which had been simply cast, tempered, and reheated. A tube 8 inches in diameter was made with a hole 5 inches in diameter, so as to leave but 1½ inches of metal on the outside. Nothing was done besides tempering or reheating, after which the tube was grooved and a screw head adapted to carry the breech. Twenty shots were first fired with 9 lbs. of powder and a 40 lb. shell; then 10 shots with a shell weighing 47 lbs., and thereafter the charges of powder were successively increased by ¼ of a lb. every ten shots, the shell remaining identical until the 100th shot was fired. On examination, no fissure of any kind in the metal was discovered, and the deformation of the chamber was found to be less than half the average in forged steel tubes.

Previous to this test, several pieces of the metal were cut perpendicularly from the axis of the tube. The average results of four trials were as follows: Limit of elasticity in tons per square inch, 22·35: charge of rupture, 39·67; lengthening per cent, 12·47.

IMPROVED SAFETY ALARM AND DOOR BELL.

The annexed illustration represents a new safety alarm which may be used by travelers to attach to the door knobs of their rooms in hotels, so that no one can enter without the fact being indicated by the ringing of a bell. The bell is attached to a steel spring which is secured in one of the two slits, A or B, on the standard by means of suitable set screws. The foot at the lower end of the standard is cross filed so that it will not slip on the knob when attached as shown in the engraving. To secure the device in place, a

rubber strap passes around the shank of the door knob and buttons on a screw on the standard. The knob consequently cannot be turned from the outside without the bell being caused to ring. The arrangement may also be modified so as to form an efficient permanent door bell. In this case a rod passes through the door casing and is rotated by a crank handle outside. The inner end enters a square hole in the standard where it is secured in a set screw. On a suitable guard plate are provided arms which extend on each side of the vertical standard and prevent its being turned down too far. The bell is adjusted, in accordance with this arrangement in the lower slit, B.

Housekeepers and business men generally will find the alarm device a useful means of protection, as burglars seldom venture in a room when the bell rings. If arranged on the chair round, the chair may be placed at an open window, and an attempt to move it will ring the bell. Farmers can attach it to outhouses, and if they wish, extend a cord or wire from the outhouse to the bed room, so that an attempt to enter will notify them, and the burglar, not hearing it ring, can be surprised and captured.

Patent pending through the Scientific American Patent Agency. For further particulars, address W. N. Patterson, Frankfort, Ky.

Spectrum of Candle and Gas Lights.

With the aid of the spectral photometer MM. Vogel and Müller have examined the most common sources of light with regard to their intensity in different parts of the spectrum, and have reached the following, among other results: The light of a wax candle is in the blue weaker than that of the stearin and paraffin candle. Petroleum shows in blue greater intensity than oil. A petroleum lamp with the wick newly cut emits more blue and violet rays than when it has burnt some time. A gas flame is in red and blue and violet brighter than a petroleum flame. The individual parts of flames which show a considerable difference as to total intensity differ but little with regard to different parts of the spectrum. A petroleum lamp emits more refrangible rays than a Silber oil lamp, but the reverse is the case with a Silber lamp burnt with petroleum, as compared with the same ordinary petroleum lamp. A comparison of a petroleum lamp with a Drummond limelight led to the result that the Drummond lime light has a considerably greater intensity in the spectrum from green downwards, this being even doubled in the blue and violet colors.