IMPROVED WAGON BRAKE.

The annexed engravings represent a new wagon brake patented through the Scientific American Patent Agency, April 25, 1876, by Mr. J. W. O'Daniel, of Cloverdale. Ind. The novel features are found in the mechanism, and principally in the devices which allow the levers for working the brakes to remain undisturbed by the oscillations of the same, as shown in Figs 1 and 2.

The joint by which the front and hind gears are coupled, so that both may oscillate in turning around curves, consists in a tubular nut swiveled to the rear bar, B, of the front gear, and a rod, C, attached to the rear hounds, sliding freely in said nut. The rod is extended both before and behind the nut, so that it may move therein as the distance between the centers of the reach varies. The brake bar, H, is carried on the hounds so as to oscillate with them and the wheels. It is arranged to move forward and backward suitably for engaging and releasing the wheels, and is connected by a bar with the lever, K. Said bar connects with the pivot, E, by a slot, so that it can slide to pull and push the brake, and with the lever, K, by a curved slot and pin, so that it can swing with the wheel. The lever is pivoted to an arm, O, fitted on the reach, and, as already stated, remains at all times in the same relation to the box.

Fig. 1.

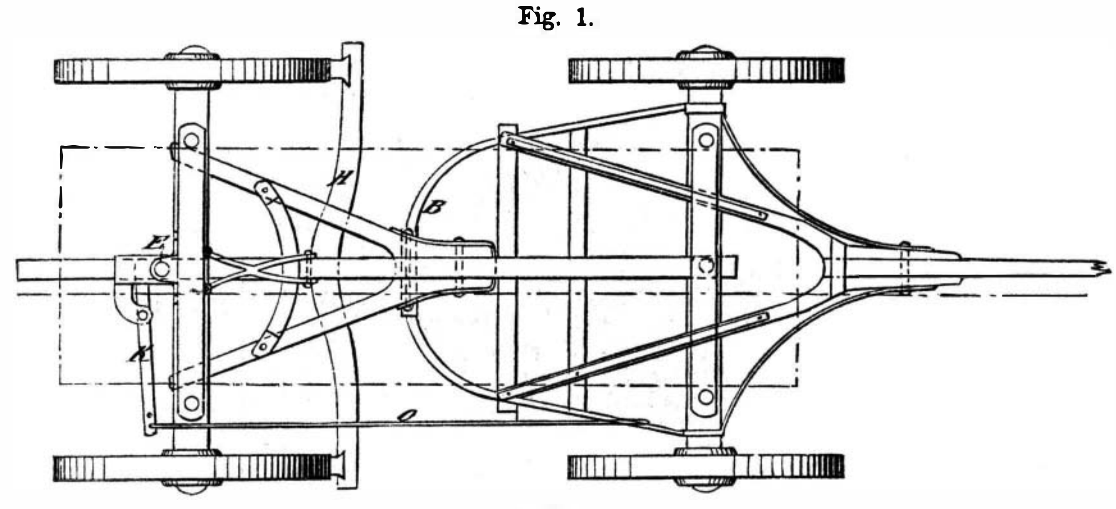
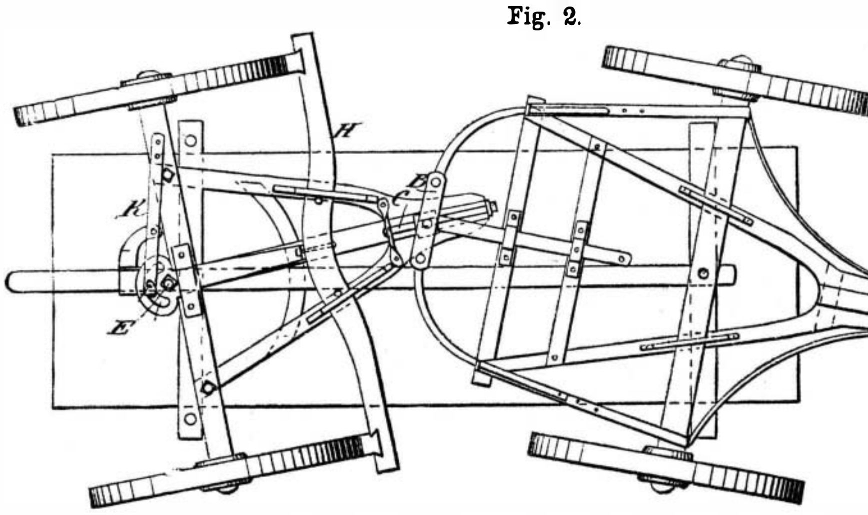


Fig. 2.



O'DANIEL'S IMPROVED WAGON BRAKE.

Bergen Hill Minerals.

The new tunnel of the Delaware and Lackawanna railway, through the trap rock formation of Bergen Hill, opposite New York city, is now nearly completed. Mr. Edward H. Fletcher, 124 West 54th street, this city, obtained a quantity of specimens of zeolites and calcites, taken from pockets in the tunnel, at depths of 50 to 150 feet from the surface. They comprise apophyllite, prehnite, laumontite, natrolite, pectolite, stellite, stilbite, analcime, datholite, and fine varieties of calcites. Intergrouped with some of these, are also chabozite, heulandite, gmelinite, levyne, copper pyrites, iron pyrites, galena, and blende.

IMPROVED RAILWAY RAIL.

The invention herewith illustrated is an improved continuous rail for railways, by which it is claimed that the battering and breaking of the ends of the rail at the joints is avoided, and less wear and injury to the rolling stock produced. In the sectional view, Fig. 1, A represents two rail sections of symmetrical shape, with base flange and head, each rail resembling the section of a common rail split into halves along the longitudinal axis. The rail sections, A, are joined longitudinally and provided with interior recesses for a longitudinal wooden core, B. By laying the sections so as to break joints, battering at the end is avoided and the rails are rendered more durable. The heads of the rail sections are provided with a tongue and groove, which affords mutual support to the adjacent parts, and also prevent the inside corners of the rail heads from breaking. The compound rail thus constructed is claimed to be stiffer and stronger, and smoother throughout, while the wooden center rail or core imparts a certain degree of elasticity to the same. The interior wooden rail is covered on all sides and protected against the weather, so that it may last a long time, and may be replaced when required. While twice as many fish plates will be used, they will only need to be half as long and half as thick as usual, thus effecting a saving of one half the material. The same number of bolts will be required as in the old rail, but they will not need to be so heavy, as at every joint there will be the solid middle of a rail section besides the wood to support it. The principal use of the bolts and the fish pieces will be to hold the parts together, which will not require great strength, as the base is double and stands apart, with the flanges extending outward on either side; the tops will gravitate together, and, the greater the weight upon them, the more they will press together. The inventor points out that his device effects a saving of over a solid inch of iron or steel, which will pay double the cost of extra work required in construction. Owing to the smoothness of the road, he considers that there will be less damage to goods in transportation, and that pleasure and safety in travel will be increased. Less labor will also be required in keeping the road bed level. A side view is given in Fig. 2.

Patented through the Scientific American Patent Agency, February 29, 1876. For further particulars relative to the manufacture and sale of this rail under a royalty, address the inventor, S. Sutton, Lisbon, Linn county, Iowa.

Fig. 1

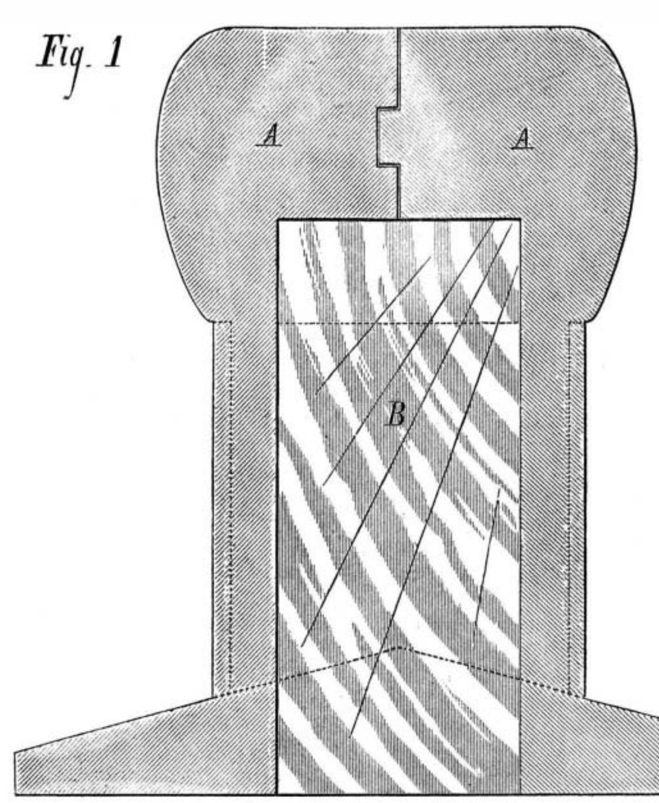
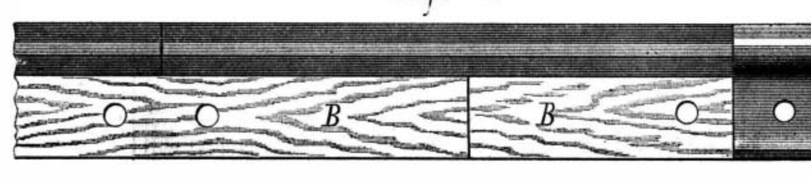


Fig. 2



SUTTON'S IMPROVED RAILWAY RAIL.

An Improvement in the Manufacture of Silver Mirrors.

At a recent meeting of the Paris Société d'Encouragement des Sciences, M. Débray described a new method designed to remove the previously existing difficulties in the way of preparing silver mirrors. From this address we extract the following:

Up to the year 1840, glass mirrors were made exclusively with a backing of tin amalgam. The operation was, and still is, as follows: A sheet of tinfoil weighing 1,000 to 1,140 grains per square foot, is spread out perfectly smooth on a flat horizontal stone; upon this is poured a thin layer of mercury, and then a well polished plate of glass is shoved from one side on to the tinfoil, driving off the excess of mercury. The glass is pressed down against the tinfoil with heavy weights for 12 hours, when the latter becomes sufficiently adherent to the glass. The plate is gradually raised to a vertical position, to allow the excess of mercury to flow off. This last operation, which may be compared to a drying, lasts 8 or 10 days. The necessary quantity of mercury weighs about the same as that of the tin, that is, 700 to 800 grammes per square meter, or 1,004 to 1,148 grains per square foot.

The disadvantage of this process is that the workmen are exposed to the injurious action of mercurial vapors. Attempts have therefore been made to cover mirrors with silver. In 1840 an Englishman named Drayton employed an ammoniacal solution of nitrate of silver, which he reduced upon the glass with an easily oxidizable essential oil, as essence of cloves. The process was modified by different chemists, but was first actually introduced into practice by Petitjean, who employed tartaric acid as reducing agent; and in 1856 he started a silver mirror factory at St. Marie d'Oignies, in Belgium. Liebig's process with milk sugar is not mentioned by Débray. It was first introduced into Cræmer's mirror factory at Doos, near Nüremberg, in 1859. In the Petitjean process, the plate of glass is laid on a horizontal cast iron table with double floor, and heated to about 40° C. (104° Fah.) After being cleaned perfectly, it is flowed first with a solution of nitrate of silver, and then with tartaric acid. In about 20 minutes the silver begins to be deposited on the glass; and in about 1½ hours, the time varying with the strength of the solution, the silvering is complete. The liquid is then allowed to run off, the mirror is washed with distilled water and dried, and finally the silver film is protected with a coat of varnish.

From 5¾ to 7½ grains of silver suffice for a square foot, and 1½ cents worth of silver is enough for a surface that would require 1,000 grains of tin and as much mercury. The great fluctuations in the price of these metals are frequently very embarrassing to large mirror factories. By the new process a mirror can be made in a few hours; while the previous method required at least 12 days, and also required more costly materials. Débray says that this silvering process has almost entirely supplanted the old mercury process. L. Lobmeyr, in his report on glass at the Vienna Exposition, also states that mercury mirrors will apparently soon go out of use.

Silver mirrors, however always have these objections, that the image is somewhat yellowish, and that the silver does not adhere so perfectly to the glass as is desirable; it often happens, too, that the silver film comes off in spots where it has been exposed to the direct rays of the sun; and finally, notwithstanding the protection of the varnish, the silver gradually blackens under the influence of sulphuretted hydrogen. The latter objection is especially noticed in exporting mirrors across the equator; the mirrors are blackened by the exhalations from the hold of the vessel, where they lie packed for months. For this reason mercurial mirrors, although they frequently suffer much from the heat in tropical countries, cannot be supplanted by silver mirrors; although the latter are proof against injury by heat.

Even if these objections were quite overbalanced by the cheapness of manufacture and freedom from mercurial diseases, it would still be very desirable that they could be avoided. This has now been accomplished in a very simple manner by a Paris engineer, named Lenoir, previously well known through his gas machine. The glass is silvered as before and washed, then flowed with a dilute solution of cyanide of mercury and potassium. This dissolves a portion of the silver and precipitates some mercury, which combines with the remaining silver to form an amalgam, which is much whiter and adheres more firmly to the glass than the silver. The conversion takes place instantly. The quantity of mercury taken up varies with the time that the mercury solution and silver are in contact; in one experiment, made by Débray, he observed that it did not exceed 5 or 6 per cent. The use of the solution, which is itself a very poisonous cyanogen compound, is not dangerous if very dilute; this solution has been