NEW SPRING GEARING FOR VEHICLES.

The peculiar shape of the springs shown in the accompanying engraving, in connection with the gearing by which they are made to carry the body of the coupé, presents some strong advantages. By this spring and gearing a direct draught is obtained from the axle trees, and the body of the vehicle is supported at any desired point, in a manner much superior to that realized in the ordinary platform or other gearing. The spring is so shaped that its different bends support each other, compelling the leaves to roll together with the varying downward pressure upon them, thus giving great strength, as well as adding much to the beauty of a phaeton, coupé, chariotee, or other vehicle in which such spring is used.

A carriage thus built is easier riding than one furnished with the elliptic spring, and works comparatively without friction. In a chariotee these springs are clipped with the shaft to the axletree—a combination which is also patented—and this makes a two-wheeled vehicle in which the rider does not experience any jolting from the motion of the horse. In the spring and gearing on the coupé shown the draught is from the axle and king bolt; there is no strain from the top of the spring, but it is all from the end, the springs being clipped to the axletrees without reach or connectings rods between axletrees. These springs are cheap, light, and simple of construction.

Further particulars may be obtained by addressing C. M. Murch, patentee, 278 and 280 West Sixth Street, Cincinnati, Ohio.

COUPÉ WITH MURCH'S NEW SPRING GEARING.

Explosive Waves.

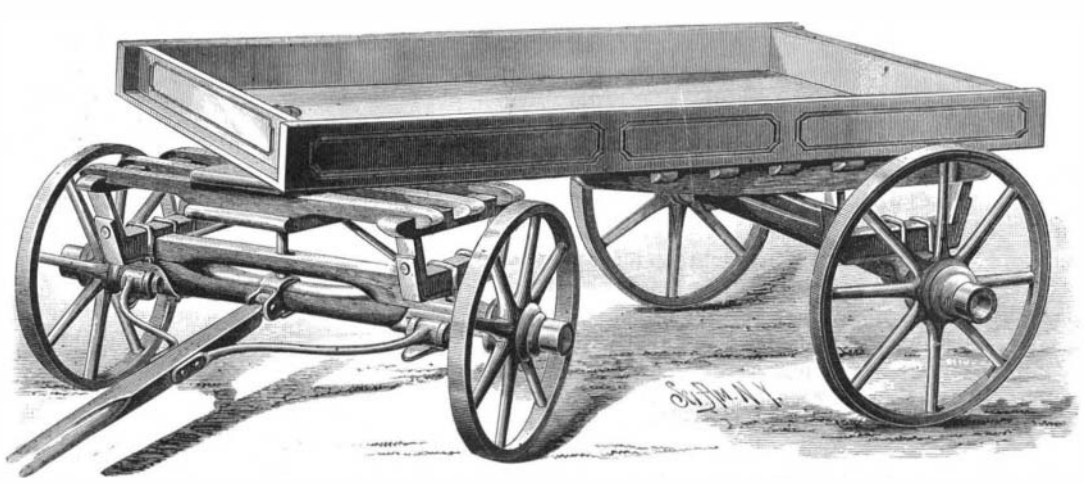
Berthelot and Vieille have investigated the enormous living force and pressure which are propagated in explosive waves by the change of chemical constitution. They observed in the oxyhydric mixture a velocity of 2,841 meters, while that of the sonorous wave is only 514 meters. With the oxycarbonic mixture the velocity of the explosive wave is 1,089 meters, while that of the sonorous wave is only 328 meters. The explosion produces a single and characteristic wave; but the sonorous phenomenon is due to a periodic succession of waves. The excess of *vis viva* communicated to the gaseous molecules by the act of chemical combination represents the precise amount of heat which is set free in the reaction. The explosive wave is propagated uniformly, and its velocity is independent of the pressure, as well as of the material and diameter of the tubes, above a certain limit. The velocity constitutes, for each inflammable mixture, a true specific constant, the knowledge of which possesses great interest, in view of the theory of gaseous movements as well as its applications in the use of explosive materials. The conclusions of the research are applicable not only to mixtures of explosive gases but also to solid and liquid explosive systems, provided they are wholly or partially transformed into gas at the moment of explosion.—*Ann. de Chim. et de Phys.*

WAGON RUNNING GEAR.

The wagon is constructed with upright frames, which are attached to the ends of the sand boards, and are connected with the axles by braces to support the body and platform of the wagon. The rear longitudinal upper bars are made with forward extensions, to give a firm support to the wagon body, and are connected by cross bars. The rear part of the wagon body is attached to these side and cross bars.

To the front upright frames are attached platform bars, which have secured to their lower sides a plate strengthened in place by inclined braces. This plate carries grooved blocks upon which rest rounded blocks attached to a plate upon which the fifth wheel is supported. The several parts are fastened together by a jointed king bolt having its pivot extended so as to serve as a pivot to the rocking frames. Rounded or convex bars, attached to the lower side of the plate or frame which serves as the movable part of the fifth wheel, allow the plate to rock as the wheels pass over uneven ground. The king bolt is made in two parts jointed to each other at their adjacent ends by a rod passing through the ends and through the rounded bars, so that the forward part of the running gear and the parts of the king bolt will rock upon the same axis. The method of attaching the tongue is clearly indicated in the engraving. This construction enables the forward and rear part of the running gear to rock in passing over uneven ground independently of each other and without twisting or straining the wagon body, or any part of the running gear. The wagon can be turned in a very small space, as the forward wheels readily pass beneath the body.

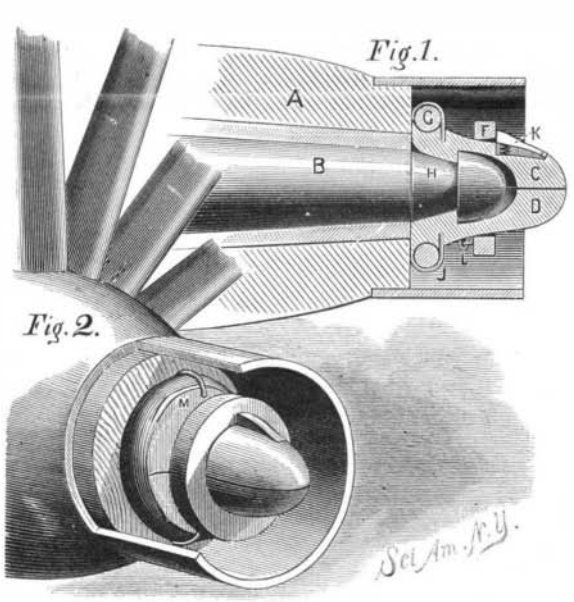
This invention has been patented by Mr. W. H. Fanning, of Lapeer, Mich.



FANNING'S WAGON RUNNING GEAR.

HUB ATTACHING DEVICE.

Figure 1 is a longitudinal section and Fig. 2 a perspective view, with part broken away, of a simple and effective device for securing wheels upon their axles, recently patented by Mr. G. H. Hombach, of St. Ignace, Mich. The outer end of the axle, instead of being provided with a screw thread and a nut in the usual way, is formed of a tapering portion, H, and a rounded head having a square shoulder forming with the part, H, an annular groove. A tapering cap divided into two parts, C D, has a recess in its inner end to receive the end of the axle. An annular ridge projects into the groove in the axle. In the outer surface of the cap, at its inner end, is a groove in which fits a metal ring, G, to which the cap sections are united by suitable hinges. The inner lower corners of the section, C, are cut away to permit the section to swing open over the part, H, of the axle on the ring as a center. The sections are kept within the ring by top and bottom projections passing behind the ring.



HOMBACH'S HUB ATTACHING DEVICE.

After the wheel has been placed upon the axle, the ring, G, with the lower cap section held in place within it, is passed over the end of the axle; the upper section is then swung down over the lower section and under the ring. The ring, F, which is attached to the lower section by the hinge, L, is swung over the tapering end of the cap, holding the sections securely together, and is retained in place by the spring catch, K. The engagement of the annular ridge with the groove in the axle holds the cap on.

The Cost of a Lead Pencil.

"What does it cost to make a lead pencil?" queried a reporter of the New York *Sun*. "First let me tell you how we make a pencil," said the manufacturer. "See this fine black powder? That's graphite. It costs twenty-five cents a pound. This white substance is German clay. It comes across the ocean as ballast in sailing vessels, and all it costs us is freight. We mix this clay and this powder together and grind them in a mill, allowing moisture to be added during the process, until the two are thoroughly assimilated and are reduced to a paste about the consistency of putty.

"This paste we press into these dies, each one of which is the size of a pencil lead, except in length. There are four leads in one of these. After they are pressed we cut them into the proper length, and bake them in an oven kept at very high heat. There we have the lead made. Its hardness is regulated by the greater or less amount of clay we mix with the graphite—the more clay we put in, the harder the lead.

"The cedar we use comes principally from the swamps of Florida, and is obtained entirely from the fallen trees that lie there. The wood is delivered to us in blocks sawed to pencil lengths, some thick, to receive the lead, and others thin, for the piece that is glued over the lead. The blocks are sawed for four pencils each. They are grooved by a saw, the groove being the place where the lead is to lie.

"The leads are kept in hot glue, and are placed in the grooves as the blocks are ready. When that is done, the thin block is glued fast to the thick one. When dry, the blocks are run through a machine that cuts the pencils apart. Then they are run through a machine that shapes and burnishes them, and they are ready to be tied in bunches, boxed, and put out.

"The different grades in value are made by finer manipulation of the graphite. Here is a pencil that is about the average quality used in every-day business. It costs a little more than one quarter of a cent to get it ready for market. We sell it to dealers at one hundred per cent profit, and the dealer makes much more than that. Of this grade an operator and the machinery will easily make 2,500 a day."

Visit of the British Association.

During the discussion in the Dominion House of Commons upon the vote of $25,000, to defray the expenses of the meeting in Montreal in August next of the British Association, some further arrangements for the reception of members were made known. The excursion to the Rocky Mountains will, it is announced, take place on September 4, the members being taken by the New Canadian Pacific Lake Route, where specially constructed steamers make direct connection with the railway on each side. The excursion will probably occupy two weeks, and arrangements have been made that members of the party may not be put to greater expense than one dollar and a half per diem during the trip. Of the $25,000 granted by the Dominion Parliament, $5,000 will be used to defray the expenses of the meeting itself, and a fund is being raised to guarantee the Association against loss in connection with the publication of their proceedings. In addition to the Rocky Mountains excursion, others will be arranged to Ottawa, Quebec, and probably to Belœil Mountain, a locality of great geological interest. Active preparations are being made at Montreal, Toronto, and other places which will be visited, to give the members a due reception. It has also been arranged by the Associated Atlantic Cable Company that social cable messages to and from the delegates and their friends shall be sent free of charge. This is regarded as a considerable contribution toward the success of the meeting in Montreal.

Vincenti's Modification of the Bobbins of Electro Magnets.

The ordinary bobbins are replaced by a thin sheet of copper, whose width is equal to the length of the arms of the magnet, and the successive layers of sheet copper are insulated with gum lac and silk ribbon. A maximum magnetic effect is obtained when the number of revolutions is such that the resistance of the band is to the external resistance as the thickness of the uncovered band is to that of the insulated one.

In order to obtain the best results, Müller's rule must be conformed to, that is to say, the diameter of the core must be equal to the thickness of the magnetizing bobbin (in which case the resistance of the latter will be equal to twice the external resistance), and the length of each arm of the magnet must be six times greater than its diameter.—*La Lumière Electrique.*