

A Multitudinous Clock.

The renowned horologist of Villingen in the Black Forest, Christian Martin, has just completed a clock which, as a marvel of construction, probably surpasses all that has hitherto been achieved in the clockmaking art. The clock is three and a half meters high, two and three-quarters broad, and is set in a magnificent Gothic case. It shows the seconds, minutes, quarter hours, hours, days, weeks, months, the four seasons of the year, the years, and leap years until the last second of the year 99,999 A.D. The clock is not only chronological, but geographical, and shows the right time, by comparison, in every latitude of the northern and southern hemispheres. It records the successive phases of the moon; and it strikes the minutes as well as the quarters and hours.

The mass of automatic machinery in it will seem stupendous, even to those who have seen the splendid specimens of local Black Forest clockmaking in the public Clockmakers' Halls at Tribury, Furtwangen, and other places, and the great clock on the opposite side of the Rhine in Strassburg Cathedral. There are multitudes of working figures, representing the life of man, the creed of Christendom, and the old Roman and German mythologies. There are sixty different personages to strike the sixty minutes—the Guardian Angel, Death as a skeleton, the twelve Apostles, the ages of man, the four seasons, the twelve signs of the zodiac, the seven Teutonic deities—after which our days of the week are named—and many others.

During the night hours, winter and summer, a night watchman comes forward and blows the hour on his horn. At sunrise a cock appears and crows lustily. The cuckoo, the inevitable ornament of a Black Forest ideal clock, remains concealed in the works of Herr Martin's clock until spring. The great face of the clock has thirty-two distinct compartments. A whole series of movable pictures are exhibited in succession by the works—representing in turn the seven days of Creation and the fourteen "Stations of the Cross." A little sacristan rings a bell in the spire, and then kneels down and folds his hands. The musical works, always a great feature in the Black Forest clock, have a sweet, flute-like tone.—*Echo*.

IMPROVED SPRING WHEEL TRACTION ENGINE.

We illustrate an improved spring spudded wheel, by Messrs. J. & H. McLaren, Midland Iron Works, Leeds. The tires of the wheels are formed with openings, through which shoes are protruded by the action of

spiral springs, in such a manner that two or more of these spuds of each wheel will bear at the same time upon the road. Fig. 2 shows a side view of a wheel fitted with spring shoes, and Fig. 3 a cross section of the same wheel.

The rim, A, of the wheel is formed with openings, B, through which the shoes, C, protrude. The projections are shown as being made in pairs, cast in one with a connecting piece, D, bridging the portion of the tire

great tractive power is obtained, and the road is preserved from much damage. If desired, the springs, D, may be compressed by means of the nuts, H, to such an extent that the rim is always off the ground, whereby the advantage of a spring wheel is obtained, or if the pressure on shoes be applied by spring spokes from the boss, there is obtained a spring-carried engine."

This engine, says the *Mechanical World*, is very powerful, a load of 76 tons, viz., a marine boiler weighing 56 tons and trolley 20 tons, having been drawn by one of its class over the streets of Liverpool.

Formation of the Diamond.

Among the many theories existing as to the formation of the diamond, that of Professor Simmler, of Switzerland, is certainly not the least probable. The diamond often incloses cavities which, in some instances, contain a gas, in others a liquid. Sir David Brewster, who had given much attention to the subject, found, in investigating the nature of the liquid, that its refractive power is less, but its expansive power greater, than that of water. In comparing the results obtained by Brewster with those calculated for other liquids, Simmler found the numbers for the expansive and refractive power of the liquid referred to to coincide singularly with those for liquefied carbonic acid. But other facts observed by different savants tend to prove also the presence of this agent in the coating of the most valuable of gems. Upon the bursting of such crystals there often occur two liquids in the cavities, the one behaving like water, the other like liquid carbonic acid. On one occasion it was observed that the liquid in a quartz crystal which was dashed to pieces scattered its contents around with a great noise, burning holes in the handkerchief wound around the hands of the experimenter. The acid content itself had disappeared. Upon these observations Professor Simmler based his theory. If carbon be soluble in liquid

carbonic acid, it would then only be necessary to subject the solvent to slow evaporation; the carbon would thereby be deposited, and, by taking proper care, assume crystalline forms. In evaporating quickly the so-called black diamond, which, in the state of powder, is much used for polishing, the colorless diamond might be produced. Though the liquid referred to has never been subjected to chemical analysis, the formation of liquid carbonic acid in the interior of our globe may, nevertheless, be considered as highly probable. In the gaseous form we know it to be evolved in immense quantities from fissures, volcanoes, and mineral springs. When now this gas is produced in the cavity of a rock which is free from fissures, it will finally be compressed so highly that it will assume a liquid form by itself. Certain rocks may be considered strong enough to resist the expansive force

of this agent, and if soluble carbon were there present, it might be taken up and redeposited, the carbonic gas escaping through some newly formed fissures. If this theory is correct, the artificial production of diamonds may some day be accomplished.

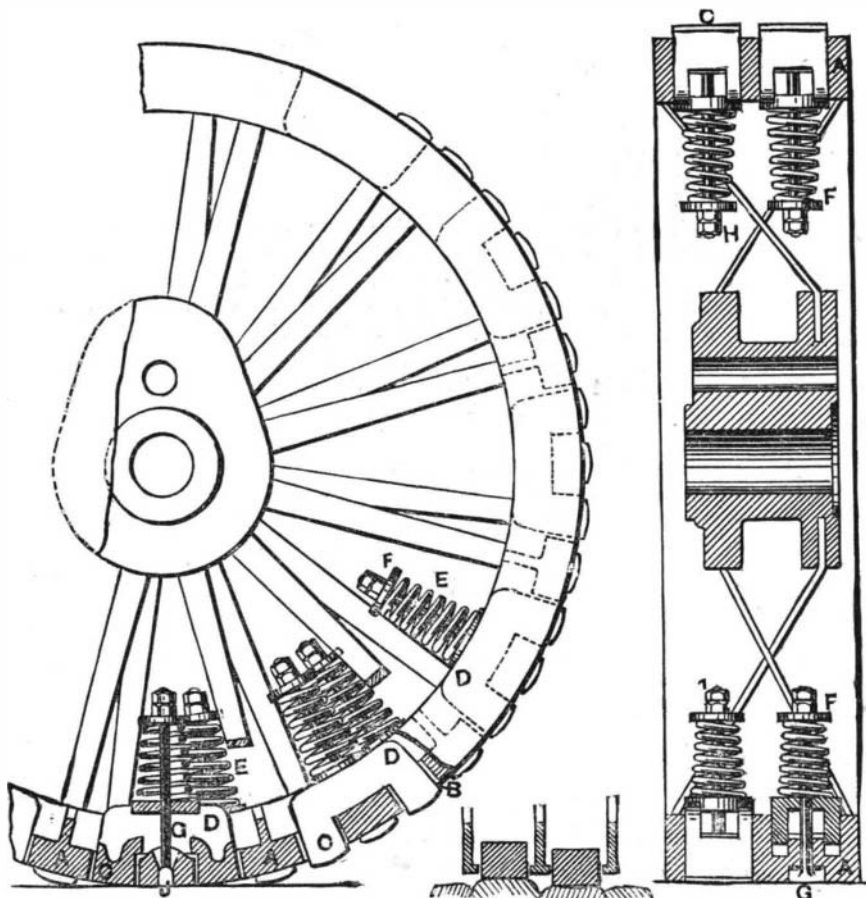


Fig. 2.

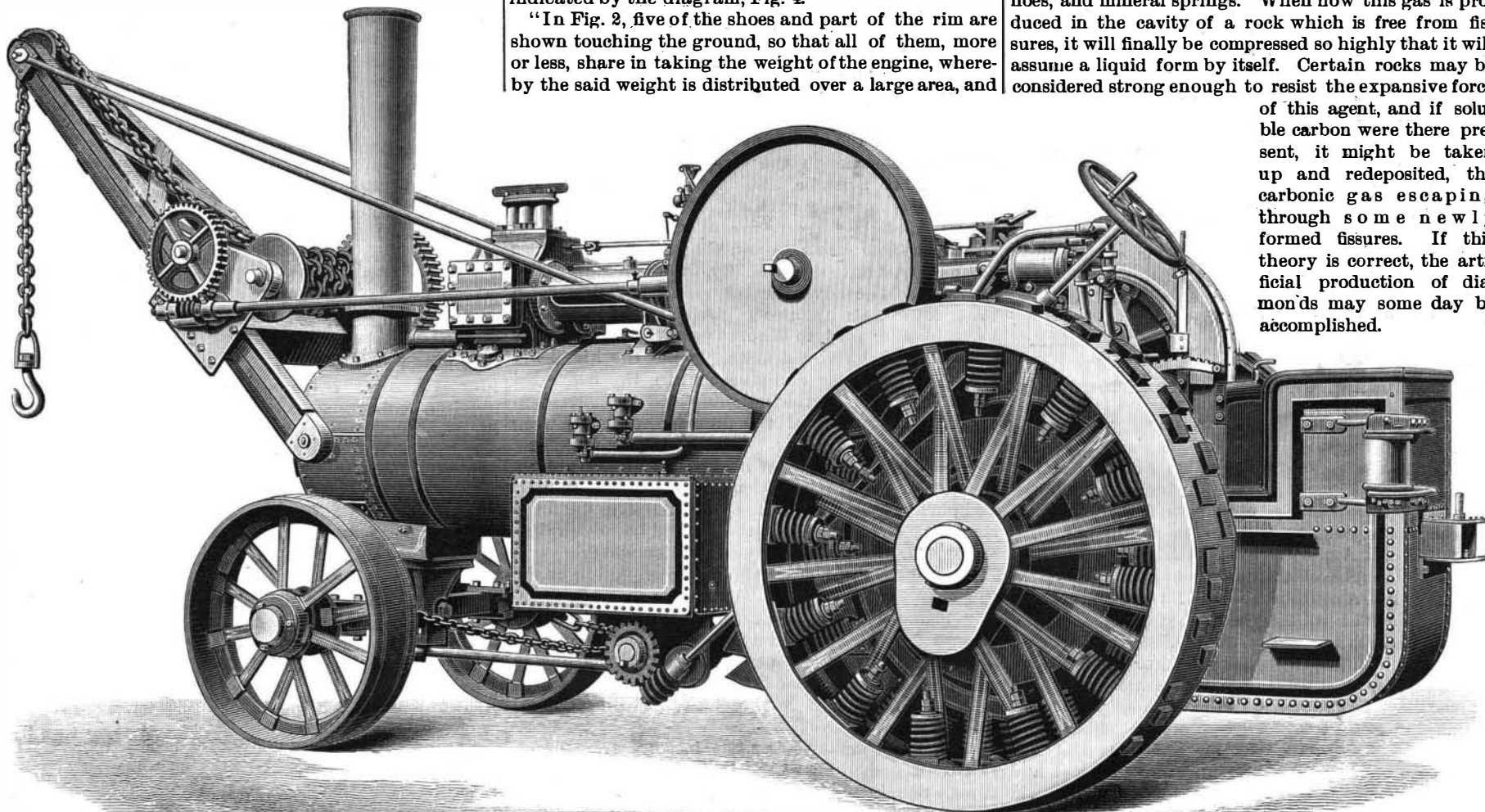
Fig. 4.

Fig. 3.

SPRING WHEELS FOR TRACTION ENGINES.

between two adjacent openings, and having a seat, upon which bears one end of the spring, E, the other end bearing against the piece, F, carried upon the bolt, G, furnished at its upper end with nuts, H, for adjusting the pressure of the springs, and at its other end with a crosspiece, J, engaging in a recess correspondingly formed in the part of the tire between two adjacent openings, B. It will be readily seen, say Messrs. McLaren, that "when the projections or shoes are arranged in more than one circumferential row, acted upon by independent springs, the wheel will accommodate itself to lateral inequalities of the road, as indicated by the diagram, Fig. 4."

"In Fig. 2, five of the shoes and part of the rim are shown touching the ground, so that all of them, more or less, share in taking the weight of the engine, whereby the said weight is distributed over a large area, and

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