AN ELECTRIC DETECTOR OF ORES.

The most difficult problems encountered by the seeker of metals, both noble and base, cannot be fully solved by geological rules. In order to determine the location of blind ledges, and the direction of their dip; the direction of ledges which crop on level ground; the position of the apices and the direction of dip of the principal pay chutes in blind ledges and in undeveloped ledges; the line followed by the pay streak in placer ground, as well as to ascertain definitely the existence or non-existence of ores in any special area of ground, all the prospector can do is to make a shrewd geological guess.

It is said that more money has been spent in guessing of this kind than is ever returned by actual finds. No wonder that the divining-rod charlatan once flourished in ore-mining regions, and that even to this day many a superstitious miner clings to the divining-rod fallacy.

A method of detecting minerals has been discovered and invented by Fred Harvey Brown, of Garvanza, Cal., which, based upon sound electrical laws, seems to place in the hands of the gold prospector a ready means of locating ores with rapidity. Mr. Anthony Blum, of 35 Court Street, Boston, Mass., who is interested in the patent, has tested the apparatus used,

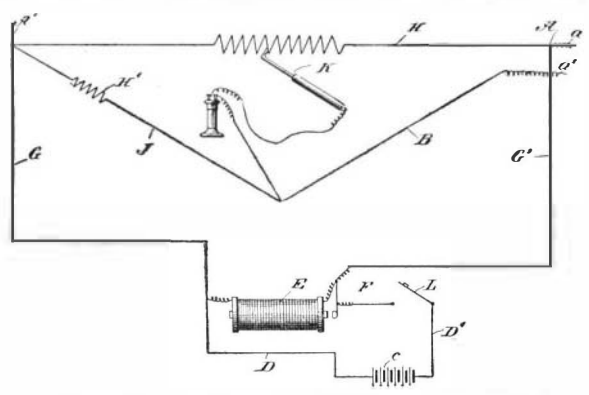


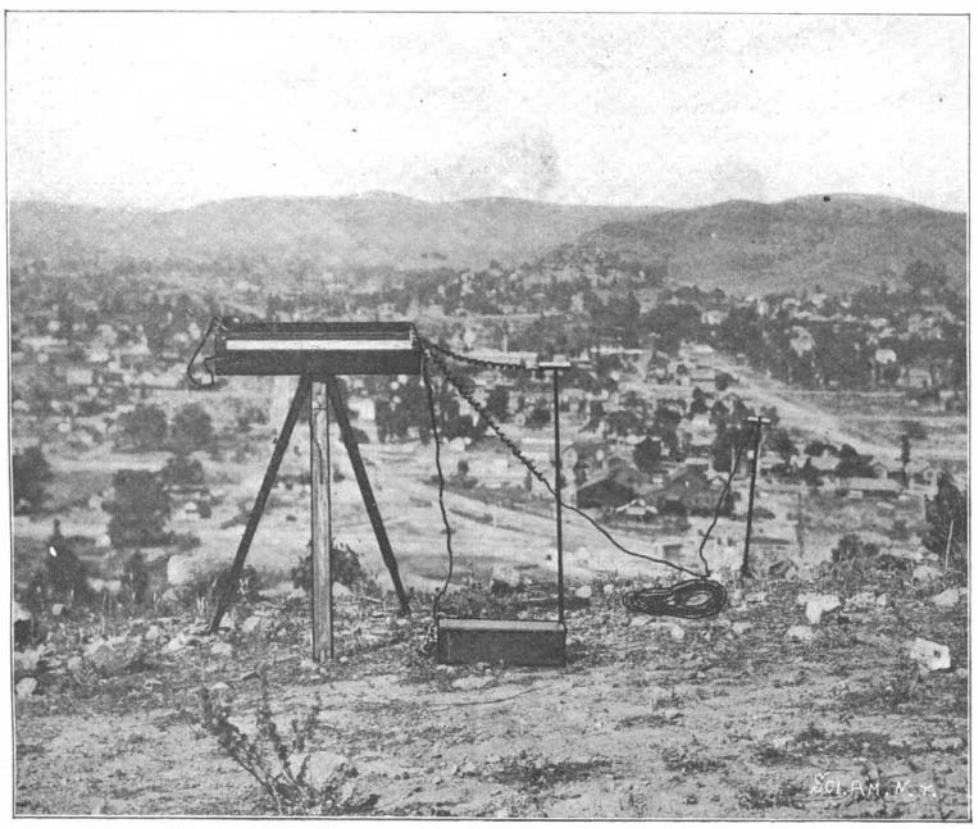
DIAGRAM OF MINERAL DETECTOR CIRCUITS.

in Ontario, and, it is claimed, with success. The Brown method consists in utilizing the various resistances offered by metals in the transmission of electrical currents.

Gold, silver and copper are the three best conductors of electricity which are known to us. It follows that earth in which these metals are contained is a better conductor than earth without them. In order, therefore, to detect their presence, it is necessary to measure the resistance of the earth as a conductor. The amount of resistance is ascertained by inserting two rods in the ground at a definite known distance apart. The resistance between the two rods is measured. If this resistance be high, the ground between the rods is barren of metal; if low, a good conductor is buried in the ground. Several measurements of the same nature are taken in order to cover a fairly large area. The resistances are plotted on a map of the ground, a study of which reveals the location of all the metal contained in the ground traversed. After having located an ore the next step is to ascertain approximately its depth. The long-established principle that a current follows the path of least resistance is applied, in order to ascertain the depth. To determine the depth of an ore already located, the rods are placed a long distance apart, the measurements over the ore body being successively shortened until they no longer give any indication of the presence of metal. To be sure, this method does not indicate the character of the ore; but that can be easily enough determined by the nature of the region itself.

The accompanying diagram shows the various parts of the apparatus used, as well as the circuits. The apparatus is set up at any convenient point. An electrode or conducting rod of brass is driven into the earth, which rod is connected by a wire, *a*, with the binding post, *A*, of a Wheatstone bridge, *E*, which forms part of the apparatus. A similar conducting rod is connected with the other binding post, *A'*, of the Wheatstone bridge. A battery, *C*, is connected by, and in series with, wires, *D D'*, and with an electromagnet, *E*. An interrupter, *F*, is arranged to break the circuit, *D'*. Wires, *G G'*, run to the diamond points of the bridge at *A A'*. Between the points, *A A'*, a high resistance wire extends which is calibrated from *A* to *A'*. In one arm, *J*, of the bridge a resistance, *H'*, is inserted. A telephone receiver forms with a stylus, *K*, a part of the bridge circuit. The end of the stylus is arranged to contact with the high resistance-wire, *H*. When the contacts have been made with the brass rods previously mentioned, the operator closes the circuit by moving a switch, *L*. The battery, *C*, then sends a current through the electromagnet, *H*, and through the wires, *D D'*, thus magnetizing the core of the magnet and setting the interrupter in operation. In this manner the current in the circuit, *D D'*, is made and broken. The interrupter causes what is termed a "direct-extra current" to be thrown off from the convolutions of the electromagnet, *E*, when the circuits, *D D'*, are open. This direct-extra current consists of impulses which are continuous in direction and are successively thrown off in harmony with vibrations of the interrupter. The impulses pass through the only circuit which is then closed, or in other words, through *G G'*, wire *a*, into the earth and out of the earth at the corresponding brass rod, and through the wire *a'* to the bridge at *A'*, through the arms, *H*, *J* and *B*. The operator then, with the telephone receiver at his ear moves the point of the stylus, *K*, along the calibrated wire, *H*, until a point of silence is reached. By this method a tone is produced in the receiver which is clear and pronounced to the point of silence. The absolute point of silence occurs at the point of balance of the bridge.

With this method of ascertaining the presence or absence of ores in mining regions it is evident that much of the time and labor which were formerly spent in prospecting is reduced to a minimum. Prospecting no longer becomes a matter of guesswork, but of scientific certainty.

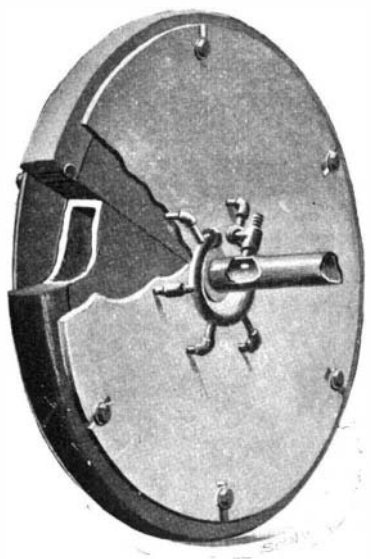


THE MINERAL DETECTOR SET UP.

Various schemes have been suggested from time to time for the practical utilization of the power exerted by the brisk lake breezes for which Chicago is famous among other things. The latest in this line is the invention of Charles Wondries, of that city, who recently gave a public demonstration of a device invented by him. He makes use of the draught of a high chimney, and for the purpose of exhibiting his machine placed it in an abandoned stack at Riverside, a part of Chicago. Despite the fact that the chimney was declared unsafe, quite a number of persons ventured inside to witness the operation of his machine. A strong west wind was driving at the time, and it blew into the opening of a canvas chute at the base of the chimney. It was carried up with increasing velocity until it reached the top, where it was directed against the blades of two wheel fans, which in turn drove a large flywheel. The power produced is said to depend on the height of the chimney. Wondries says he has been driving a sewing machine at his home for six months by this means, using a very small stack.

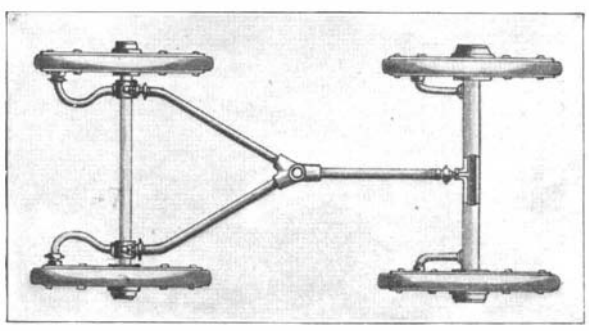
PUNCTURE-PROOF INFLATABLE WHEEL.

An inflatable wheel of an entirely new design is herewith illustrated. The wheel is practically puncture-proof, and will be found especially serviceable for automobile and other vehicles. The structure affords a resilient support to the superimposed load, and owing to the substantial construction is especially adapted for long-distance runs over ordinary roads.



A PUNCTURE-PROOF INFLATABLE WHEEL.

One of our illustrations shows the simple construction of the wheel. Held tightly between two plates which form the side faces of the wheel are a series of pouches or cells made of rubber or other elastic material and capable of expanding under the pressure exerted by an inflating medium, such as air or gas. An elastic cushion tire surrounds these pouches, and is held in place by bolts which pass through the same and clamp it tightly between the side plates of the wheel. It will be observed that this tire, which is compressible, has direct engagement with the elastic pouches that are adapted to afford a cushion to the tire; and as the tire is adapted to give under the weight of the load, and when striking obstacles in its path, it is found necessary to employ yieldable connections between the tire and the side plates. This is provided by arranging the stay-bolts to enter slots radially disposed along the rims of the side plates. From this description it will be seen that the pouches provide a series of independent chambers or cells within a wheel of cellular structure, and it becomes important to provide a means for simultaneously and uniformly inflating these sections. This is attained by providing an annular distributing pipe arranged to loosely surround the hub portion of the wheel and having connection with each of these pouches. A force pump may then be applied to this pipe, and the wheel will be uniformly inflated. Owing to the shielded positions of the pneumatic pouches, the possibility of a puncture in one of these wheels is remote.



THE WHEELS CONNECTED FOR UNIFORM INFLATION.

The wheel is illustrated as secured to a hollow axle, the latter serving as a reservoir for highly compressed air, so that in case of leakage from the pouches they may be reinflated by opening a valve which connects this chamber with the distributing-pipe. One of our engravings shows a running-gear provided with these wheels and hollow axles. The illustration indicates the method of connecting the upper parts so that all the wheels may be pumped up simultaneously by applying the pump to a connection at the center of the machine. A patent on this improved wheel has recently been granted to Mr. Alexander Honrath, 5 West End Avenue, New York city.

Dr. Adolph Cohut recently published an article in the Berliner Tageblatt disputing the assertion that the late Emanuel Hermann, of Vienna, was the inventor of the postcard. He says the credit is due to Heinrich von Stephan, who was Postmaster of Germany. He made an eloquent plea for the postal card at the Fifth Postal Congress at Karlsruhe in 1865, but the card was not adopted at that time. This, however, was the first agitation of the subject.