[For the Scientific American.]

The Hughes Telegraph.

[Continued from page 11.]

In continuing our review, it is necessary to present the claims of the inventor. From his patent, granted May 20, 1856, we copy them as follows:—

"I do not claim any feature of any existing printing or marking telegraph, as any part of my invention; nor do I desire to interfere in the least with any heretofore invented. Conceiving that I have made important improvements in telegraphs, I desire protection only for that which is novel and of my own invention.

I claim, first, the holding in place of the attractive power of electro or natural magnetism, as applied to the telegraphic purposes, whether the same be applied in the manner described, or in any similar manner, producing like results.

Second, particularly I claim combining with the permanent magnet, an adjustable spring almost sufficient to sever it from its contact with the soft iron of their electro-magnet, and a lever, or its equivalent, which, after the permagnet has been separated from the iron by the action of a current, shall bring it back again into renewed contact by the action of the power which has been called into action by the retreat of the magnet.

Third, I claim the employment of two cog wheels or circuit breakers at each station, so arranged that one shall be in connection with the electro-magnet at the same station, and the other in connection with the transmitting cylinder at that station, the whole being arranged so that the connection alternates at each station for every letter between the electro-magnet and the transmitting cylinder at that station, in such a manner that the through connection is always simultaneously through the transmitting cylinder of one station, and the electro-magnet of the other station, whereby the machine at each station can, at the same time, be transmitting a message and receiving a message; it being understood, however, that I do not claim, in general, the use of a single wire for the simultaneous transmission of different messages by means of rapid changes of connection, which is not new, but only the peculiar manner as claimed, in which I have applied it in connection with my machine.

Fourth, so arranging a bolt and operating the same by a cam, or its equivaleat, that it shall act upon a wheel attached to the shaft of the type, so as to preclude the intelligence from one station being communicated to any other station or stations on the circuit from which it is desired to withhold the communication.

Fifth, I claim the employment of a vibrating spring properly weighted at its extremity, if necessary, and so arranged by a series of mechanism as to govern and regulate the movement of the type wheel. This I claim also as a governor in other machinery, without limiting its use to its connection with electro-magnetism.

Sixth, I claim printing by electro-magnetism by a continuously moving type wheel, printing while in motion.

Seventh, I claim the arrangement of a cylinder with pins spirally arranged thereon to operate by contact with metallic points to close and break the circuit, when this is combined, for the purposes set forth with the systems of keys and catches, so arranged that any desired point may be thrown into a position, where it will be retained until it is struck by its corresponding pin. D. E. HUGHES.

Louisville, Ky."

The specification of the inventor's patent is prefaced by the words: "The nature of my invention consists in the manner of using natural and electro-magnetism in its application to machinery for telegraphic purposes, and in the employment of a vibrating spring for the regulation of this and other machinery." And again it says: "Thus the press and feed wheel are governed by the combined use of natural and electro-magnetism, and the revolutions of the type-wheel are governed by the vibrating spring."

Considering that the application of the combined action of electro and permanent magnetism for telegraph machinery, was known long ago, and is now in use in the greatest variety of constructions, it seems, at the outset, questionable whether the employment of it, by the above-mentioned instrument, yields advantages hitherto unknown, or whether it is so constructed as to evade a conflict with Morse's patent. Morse says: "The essence of my invention being the use of the motive power of the electric or galvanic current, which I call electr-omagnetism, however developed, for making or printing intelligible characters, signs, or letters, at any distance," &c.

It will be observed that the required magnetic attractive power must be so strong as to counterbalance the power of the spring for raising the magnet and working the detent which sets free the crank of the printing clock-work, plus a surplus of power for preventing the voluntary separation of the magnets. A piece of soft iron coming in contact with a magnet, will become magnetic during such process, both attracting each other by having dissimilar polarity, the magnetism of the iron being proportional to the attractive power of the magnet, etc., therefore their reciprocal attraction must be strong enough to prevent a separation from each other. Now, in order to set the permanent magnet at liberty to fly off, the polarity of the iron cores has to be changed so as to be similar with the permanent magnet by electricity, as the specification says. But before this can be done this magneto-magnetism of the cores must be made inefficient by the generating of a sufficient electro-magnetic power with dissimilar polarity in the same iron cores. The electric power required for that purpose has to be of the same intensity as that which had to be used to generate this attractive power, which is to be made inefficient, and would have been already sufficient for the operation without squandering a surplus of it, in order to produce the expected change of the polarity of the iron cores.

The first claim reads thus: "the holding in place of the attractive power of electro or natural magnetism," etc. What does that mean? I find no explanation of it in the specification.

In the second claim are some little things of not much consequence for those who are acquainted with Stoehrer's Relay Telegraph. Referring to the fourth claim, I have to ask, how will it be if more than three instruments are in operation in one circuit, and how, if it is desired, that more than one station receive the communication, and the rest be precluded, as for instance, the New York station, A, Philadelphia, B, Baltimore, C, and Washington, D. Washington communicate with New York and Philadelphia, precluding Baltimore. The second closing and breaking of the circuit, as mentioned in my last communication, will force the bolt through the slot at the instrument of A, not suspending its motion, but pushing against the flange of the instruments B and C, their motion will be suspended. Now, what means are employed to keep the instrument, B, at Philadelphia in motion? And if station A has spoken to B and C, and after this B and C wish to communicate with each other, how is it done?

The fifth claim refers to the employment of the before-mentioned vibrating spring, properly weighted at its extremity, if necessary, etc.

Why *if*? Should it not read *because* necessary? Has the compensating weight and vertical connecting rod no weight? Does not temperature change all the time?

Is it not a well known fact, patent to every body, that if the oscillations of a pendulum require to be very rapid, it must be made in the form of a vibrating spring, so as to have elasticity around its point of equilibrium. The spring pendulum is a very old and well known device.

Having shown the incongruity of the other claims, I cannot, of course, be surprised by the sixth, which reads: "printing by electro-magnetism by a continuously moving type-wheel, printing while in motion." According to the specification, the press lever, operated by the crank, presses against the type-wheel like a brake of a car wheel, and will remain in that position during the dead motion of the tilting crank and of the connecting rod, and will either break the wheel or cause other mischief. Press, for instance, a paper for printing purposes against the periphery of a revolving printing wheel with your hand without either getting injured or arresting its course, and you will understand how utterly impossible it is for any one to print from a type-wheel, while in motion. (Should not the claim read, Printing while stopped, as all the other printing telegraphs do?)

The seventh claim covers a sytem of catches—but the specification does not mention any thing of them. CHAS. KIRCHHOF.

[To be continued.]

American Blister Flies.

MESSRS. EDITORS.—I noticed in No. 51, Vol. 11, SCIENTIFIC AMERICAN, an article entitled "Blister Flies in Texas," which article refers to a former correspondent on the same subject. I would state, for the benefit of those whom it may concern, that they are the true Cantharis Vittata, and are described in the United States Dispensatory, as follows: "its length is about six lines. The head is of a light red color, with dark spots on the top; the feelers are black; the elytra or wing cases are black, with a yellow longitudinal stripe in the center, and with a yellow margin; the thorax is also black, with three yellow lines, and the abdomen and legs, which have the same color, are covered with a cinerous down. It inhabits chiefly the potato plant, and makes its appearance about the end of July or beginning of August," &c. They were in great abundance in this region this season, commencing their ravages somewhat earlier than usual, owing to the extreme heat and dryness of the season. They are quite equal to the Cantharis Vesicatoria (or Spanish fly,) for all the purposes for which that insect is used. When we wish to gather them here, we shake them from the plant into a pan of hot water, and afterwards dry them in the sun. When we wish merely to exterminate them, we place straw or hay upon the ground, on one side of the patch, two or three feet wide by one or two inches deep, then commencing on the opposite side, with bushes we drive them until they take shelter under the fuel—the balance you may conjecture. A. NEWELL.

Paris, Illinois, September, 1856.

Electro-Chemical Baths.

MESSRS. EDITORS—M. Vergnes' last answer to my article, on page 395, Vol. 11, SCIENTIFIC AMERICAN, on Electro-Chemical Baths, in place of scientifically refuting, by palpable demonstration, parries off by saying "the irradiations of electricity are subject to the same laws as those of light and heat."

I understand he is acquainted with electro-plating; now I will offer him another proof in his own line of business, corroborative of what I advance, to wit, that the electric current, when free to move, passes at and near the surface of liquids, in preference to descending into them.

Take, for instance, the process of electro-plating with silver; in this process a silver plate is suspended on the positive pole, in the solution, and the article to be plated on the negative pole. Let the plating go on for a few days, and on examining the plate at the positive pole, it will be found that the action of the electric current has entirely decomposed and conveyed to the negative pole the silver at and near the surface of the solution, while the silver plate lower down, has not been decomposed at all. SAML. B. SMITH.

New York.

Advice to Manufacturers of Tin Plate

MESSRS. EDITORS—Large quantities of tin plate are used in Philadelphia for roofing, which doubtless you are aware, is put on in a different manner from the New York plan—they cutting each sheet and putting it on separately, and we putting it together on rolls with standing ridges.

The tin, as used by us, is taken from the box, edged without any preparation, and put together in rolls at the shop, and then taken to the roofs; the two sides of the tin, as a general thing, are straight and parallel, but the ends are left apparently as they are rolled. Now if the manufacturers in England made their leaded tin for roofing purposes with the sides and ends straight and parallel, and the angles right angles, or as we say, "square," they would meet with a more ready sale. I should think that while performing the operation, as at present, very simple machinery would effect the purpose; and if *they* could get up nothing to answer their purpose, if they would send word over to some of our inventive Yankees they would soon get what they wanted.

There is a duty of 15 per cent. on tin plates, and yet none are manufactured in our country, and none can be, because, we have little or no tin, and have to import all our block and grain tin. This duty, by increasing its price, prevents, to a great degree, its use as a roofing material. G. R., JR.

Philadelphia Sept., 1856.

A Simple Microscope.

When a sound eye of the average power neither long-sighted nor short-sighted, examines any object in order to see it most distinctly, the observer places the object at the distance of about *six* inches, and in this position it is seen of its natural size, and is not said to be magnified. If we hold up at this distance a finger three-fourths of an inch broad, it will appear to cover upon a wall ten feet distant a space of fifteen inches. If we hold it up at three inches from the eye, it will cover a space of thirty inches, and will appear *twice* as large, and if we hold it up at the distance of an inch and a half, it will cover a space of sixty inches, and will appear four times as large. But though magnified in these two last positions, it is not seen distinctly, and therefore we see it more imperfectly than at the distance of *six* inches.

If we look at the finger, when seen indistinctly at the distance of three, and one and a half, inches from the eye, through a small pin-hole in a piece of card, it will appear not only magnified, but tolerably distinct, and the distinctness will increase with the smallness of the aperture. The most satisfactory aperture is one made with a needle in a piece of sheet-lead or tin-foil, and when the eye is applied close to it, the vision will be such that discoveries, invisible to the eye, may be made by the observer.

A single sphere of glass, from the twentieth to the fiftieth of an inch in diameter, forms a good microscope, with which many interesting phenomena may be observed, and even important discoveries made. Dr. Hooke seems to have been the first person who made microscopes of this kind. Having taken a clear piece of glass, he drew it out, by the heat of a lamp, into fine threads, and then holding the ends of these threads in the flame, he melted them till they run into a small round globule, which hung to the end of the thread. The globule is then stuck on the end of a piece of wood with the thread cut as short as possible, standing uppermost, and the ends are ground off, first on a whetstone, and then polished on a metal plate with tripoli. When the glass sphere is thus finished, it is placed against a small hole made in a thin piece of metal, and fixed with wax. Thus fitted up it will both magnify and make some objects more distinct than many of the great microscopes.

When a microscope cannot be obtained for some special purpose, a tolerably good *extempore* one may be made by filling with water, or any other limpid fluid, two small bottles, or test tubes, crossing them at right angles, and looking at the object to be examined through the crossed parts.

The Geography of Plants.

In 1820 De Candolle, of Paris, in a celebrated essay on the Geography of Plants, published in the *Dictionary des Sciences Naturelles*, made it the starting point for botanical inquiry, that each species was derived from an individual or pair of individuals, created in one particular locality. This was soon disputed by many botanists, because kindred species of plants, were found so widely separated,—some in islands of the ocean—far distant from the continents where the like species flourished—that it was concluded there must have been numerous pairs of the same species created—each for its own particular locality. In later years, however, the discoveries of geology, tend to confirm De Condolles' views. This science points out the great probability of the submergence of large tracks of once elevated lands, and the upheaval of others, and these explain the occurrence of the same plants in islands, and continents, now completely unconnected.

Decimal Weights and Measures.

The decimal system of weights has just been adopted throughout the whole of the Prussian monarchy, as it had before been in the German Association, and in several States of the south of Germany.

When will a rational system of weights and measures be adopted in our own country? Our law-makers always have plenty of time to make long-winded speeches on party politics, but no time to make a new law, and such a necessary and good one too, to reform our weights and measures.

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