leading to points, *f* and *g*, respectively, shunt the phone out of the main line while the home office is working; an insulated point attached to the lower point of the armature of the transmitter permitting the spring, *g*, to make contact with point, *f*, just before the circuit is broken at point, E, when the armature is depressed, and breaking contact again after the circuit has been opened at point, *c*, when the armature is released. The phone at the home office is silenced while the home office is working, for the reason that its responses to local induction impulses are very loud, and if it were permitted to work, some difficulty would be met with when the receiving operator desired to "break." The small condenser, *c*, is placed around the magnetic coil to quicken the impulses and prevent sparking at points, *c* and *e*.

The phonoplex system more than doubles the capacity of a line, as it may be used between any number of intermediate stations, any two of which may carry on telegraphic communication independently of the others and independent of the Morse system.

The cost of maintenance is very light—the only actual outlay required is for the provision of battery material. It is estimated that the cost of operating a single station will not exceed $1.50 per month.

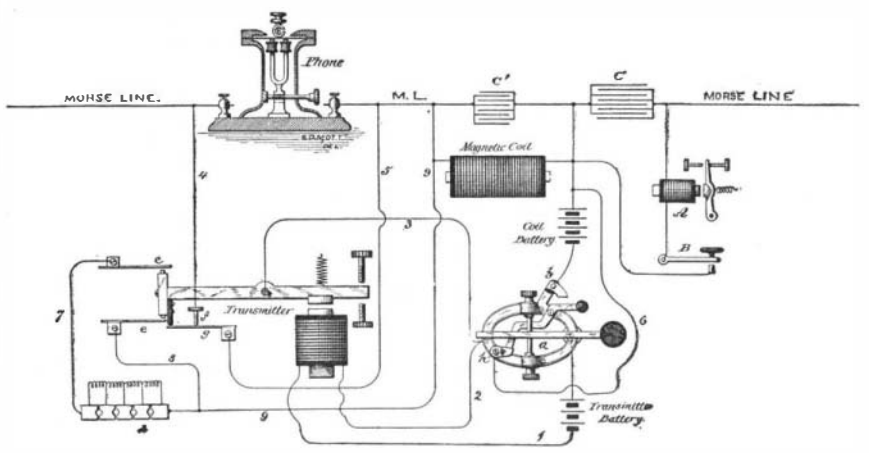


Fig. 6.—THE PHONOPLEX CIRCUIT.

Gaseous Explosions of Platinum.

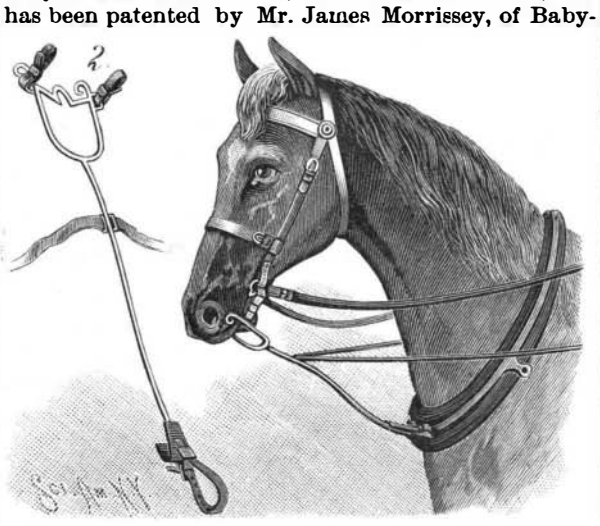
The curious fact was some time ago brought to light, says *Nature*, by Nahrwold, that solid particles are ejected from a platinum wire glowing under the influence of an electric current, and form a metallic incrustation upon the walls of a glass tube by which the wire is surrounded. The cause of the emission of these solid particles of platinum has, however, until recently, remained a complete mystery. In the number of the *Annalen der Physik und Chemie* just received will be found an interesting paper by Dr. Alfred Berliner, who, in the course of a series of experiments upon the occlusion of gases by platinum and palladium, has discovered the source of this singular phenomenon. Thin strips of platinum, before being charged with the gas under experiment, were inclosed in a narrow glass tube, and freed from all occluded gas by being heated to redness, *in vacuo*, by the passage of a constant electric current for several hours. At the expiration of this time the metallic incrustation was invariably found when occluded gas had been evolved. On charging the strips with various quantities of any particular gas, the amount of incrustation formed after the complete expulsion of the gas in each experiment was found to vary in the same proportion. Hence it appears pretty clear that the evolution of gas is necessary for the emission of solid particles. This result is strongly confirmed by the fact that palladium, which has such a remarkable power of occluding gases, produces a similar incrustation much more readily and at a lower temperature. It appears probable that the action is merely mechanical, that we have, in fact, an immense number of microscopic volcanoes or solfataras, evolving the occluded gases with such energy that portions of the crater walls are detached and carried away by main force, like their brethren on the large scale, the scoriæ and lapilli, to distances very considerable in comparison with the size of the vents.

The Effect of Gas upon Paper.

Herr J. Wiesner has sent to *Dingler's Journal* a further communication upon the discoloration of papers by light. He has already shown that papers containing woody fiber rapidly become yellow under the influence of light, owing to oxidation chiefly induced by the more refrangible rays, and that wood pulp papers would naturally be specially liable to discoloration. Gas light is less active than electric light in this respect, owing to the comparative absence of actinic rays from the former. It has lately been declared that gas acts prejudicially upon paper in other ways, and is therefore unsuitable for lighting libraries; and Herr Wiesner has instituted careful experiments with a view to test the truth of these assertions. He had before demonstrated that a wood paper after four months' exposure at a distance of 0·75 meter from an 8 candle power gas flame was not discolored more than by two hours' exposure to direct sunlight. He therefore now exposed wood paper to such other conditions as might be found in badly ventilated rooms lighted by gas. After an exposure of 5,400 hours, during which the temperature was not allowed to rise beyond 21° C. (70° Fahr.), it was found that the gases composing ordinary coal gas, unburnt, whether in their usual state or mixed with a fair proportion of oxygen, were incapable of acting upon the paper. Strips of paper were next placed in a dark room and in a shaded position in a chamber so badly ventilated that the illuminating power of the flame was distinctly diminished; other pieces being at the same time placed in a current of air in glass tubes exposed to the light of the flame. After about 20 weeks, the exposed papers, in common with all the other contents of the chamber, were covered with an equal depth of a light brown sooty deposit, while those in the glass tubes were unaltered. The woody paper alone had the faintest yellow coloration due to the action of the light. The products of combustion of coal gas do not, therefore, discolor or affect paper in any appreciable degree; and thus it follows that gas may be freely used in libraries that are properly warmed and ventilated.

AN IMPROVED BRIDLE BIT.

A fork bit, adapted for use with the ordinary bit, to cure horses of bad or vicious habits, and to improve the action and style of all horses upon which it is regularly used for a short time, is illustrated herewith, and has been patented by Mr. James Morrissey, of Babylon, Long Island, N. Y. It is made with a fork-like frame, consisting of a rigid metal bar, as shown in Fig. 2, the two prongs passing up outside the horse's jaws, and their ends being turned over to make eyes, the prongs being united by a transverse mouthpiece, the center of which has an upwardly projecting inverted U-shaped portion. Above the center of the metal bar are loops for attaching checks from the girths of the saddle or the traces of the harness, and integral with the outer side of the prongs, opposite the mouthpiece, are similar loops for cheek straps to hold the auxiliary bit loosely in the middle of the mouth. A pad or protecting strap is held in engagement with the inner flattened end of the metal bar, which has slots for retaining the strap by which the device is secured to a harness.



MORRISSEY'S BRIDLE BIT.

DAVIS' "1888" QUILTER.

The Flying Man.

I believe that athletes such as those who first obtained mastery over the problem of the bicycle could very soon learn to float, to ascend, to descend, to ride upward, to soar, and so forth, in a way which would very decisively indicate the possibility of a much fuller mastery over the problem of flight later on. Experiments which have been already made prove decisively that a man's weight can be supported by planes or sails of very moderate extent—not much greater, proportionally, to his body than an eagle's wings—if only there is either rapid motion of advance or a strong current of air against their slightly slanted surface. But these experiments have not yet been so carried on as to show fully what can be done when practice in the art of balancing in the air and in making the adjustments necessary for changing the direction of flight has been sufficiently extended. Yet Mr. Charles Spencer, a teacher of gymnastics in England, was able, after obtaining no greater velocity than would be given by running down a small incline, to sustain flight by the supporting action of wicker wings for a distance of 120 feet. Besnier, indeed, toward the close of the last century, devised a method of supporting the body by pinions, which enabled him, after a sharp run, to fly across a river of considerable width. It is certain that very little is to be gained from the attempts which have been made to direct balloons. The velocity which can be given to a balloon in still air is very small. A very moderate breeze would carry a balloon one way despite all the mechanical attempts to direct it in another, let the balloon be shaped as it may. Moreover, all such attempts are dangerous, for the wind has a great hold on the necessarily large surface of a balloon, and going against the wind would subject the balloon to destructive influences. Whenever man attacks the problem of flight, seeking real advantage from its mastery, he will aim at much more than such mere floating power as the balloon gives—at more, even, than the rapid floating motion, with power of guidance, which may be obtained by the experiments suggested above. There must also be a power of energetic propulsion while still in the air. This might be obtained by suitable adjustments of levers to be worked by a man in actual flight. But while I believe flight to be possible for man in this way, I consider the only kind of flight which is likely to be really useful to men to be that of flying machines propelled, balanced, and directed by some one or other of the natural forces man has brought under his control. That man, who has learned to traverse the land more swiftly by mechanical means than its most actual denizens, and to make the wide seas his highways by similar devices, should be unable to travel in the air, which by natural selection alone has become the home of creatures descended from reptilian forms, is to me unthinkable.—*Richard A. Proctor, in Philadelphia Press.*

AN IMPROVED QUILTER.

Among the many inventions of quilting attachments for sewing machines made by Mr. Henry T. Davis, the accompanying illustration represents what is considered the most perfect of all quilters he has ever introduced. Among the main advantages it possesses over his previous inventions are the cheap price at which it can be manufactured, as some parts are entirely dispensed with which were formerly used, thus making it lighter and very much more simplified, so that any lady can operate it. The lining of the quilt is rolled up on the outside roller, and the top is rolled up on the roller near the needle of the machine. The cotton is placed on the lining, one layer at a time, and, as the quilting is made, every time a line is sewed the operator loosens the outside roller and rolls up on the inside roller, and these operations are repeated until the quilt or comforter is made. By the use of this quilter, which was patented January 31, 1888, all kinds of coat and cloak linings are quilted in a fast and very neat manner. It is a very valuable attachment for family sewing machines, and is made by the Davis Quilting Frame Company. For further information relative to this invention, address Mr. Henry T. Davis, inventor, Nos. 182 and 184 West Houston Street, New York City.

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