IMPROVEMENT IN ELECTRO-MAGNETS.

Dr. L. Bradley, of No. 7 Exchange Place, Jersey City, N. J., has just obtained, through the Scientific American Patent Agency, a patent for an interesting and important improvement in electro-magnets.

An electro-magnet is a rod of pure, soft iron, around which is wound, in spiral folds, an insulated wire; so long as a current of electricity is passing through the wire, the iron core is a magnet, but the instant the electro-current ceases, the iron loses its magnetism. The power of the magnet with currents of given strength is in proportion to the number of convolutions in the surrounding wire, and to their proximity to its surface. Dr. Bradley conceived that both these might be increased by using a naked wire in place of those covered with silk or cotton thread, which are usually employed, separating the several layers from each other by thin sheets of paper, and trusting for insulation to the dry air between the convolutions. Magnets made in this way request, of course, that the wire should be very carefully laid, so as to make the space between the folds of perfect uniformity

For the last four years Dr. Bradley has been manufacturing magnets in this way for telegraph instruments, and they have met the general approval of operators. He has just shown us two spools—one of naked wire, and the other of wire insulated with silk, and made, as he says, of wire of the same size and length, or, at all events, of the same resistance, as measured by the rheostat—each being of No. 30 wire, and having a resistance equal to that of 4¼ miles of No. 8 galvanized wire—the standard in use for telegraph lines. The spool of naked wire is 1 inch in diameter, and contains 3,256 convolutions, while that of insulated wire is 1⅜ths inch in diameter, and contains 2,912 convolutions, showing a larger number of convolutions, and greater proximity in the naked wire, with a corresponding increase in magnetic power for a given resistance. The outer and inner layers are fastened by gum-shellac, and Dr. Bradley says the wire is never shaken or jarred from its position.

KING'S LATHE CHUCK.

This modification in the chuck for lathes is intended to facilitate setting irregular forms, such as eccentrics

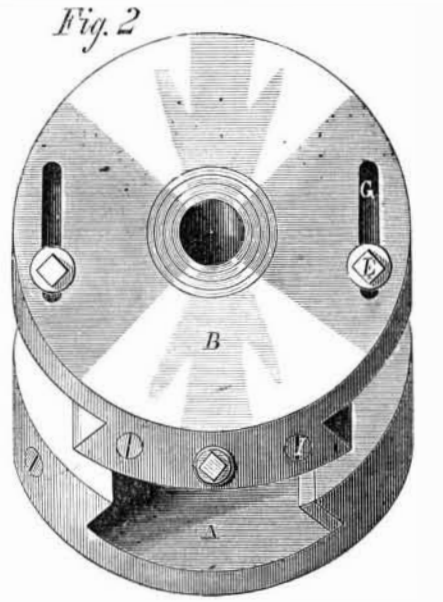
Fig. 1

or cams, and it is to be applied particularly to scroll chucks, which are arbitrary in their motions and cannot be set out of the center unless one of the jaws be taken out and started on the thread after the other jaws have been run in one turn or two. Even this will not always bring the work true, and some simple arrangement of the kind here shown will prove a great convenience. The details are as follows:—

A is the plate, which is fastened securely to the main chuck, forming a part thereof, into which the dovetail projection of the plate, B, slides; C is the hub, which screws on the lathe spindle; D is the screw, by the use of which the chuck may be adjusted to any required position with the spindle of the lathe. The face side of the dovetail projection is laid off to fractional parts of an inch, and marked with figures, so that there is no difficulty in setting the work accurately. The screws, I, hold the piece to which the screw, C, is secured firmly to the plate, B. F is the gib, which is tightened up as it wears, by screws, as usual. G G (Fig. 2), are slots through which bolts, E, pass, for the purpose of firmly securing plate, B, to the chuck, A, at any desired point.

The utility of this improvement is universally conceded by all first-class machinists who have seen it, and the proprietors of several of the largest and best machine shops have already expressed a wish to adopt it in their own workshops. This attachment may be applied to any size or kind of chuck already in use,

Fig. 2



equally as well as to new ones, and will add only from one to one and a half inches to the depth of the entire chuck, including the attachment. Although only one sliding plate is represented in this engraving, says the inventor, another slide can be added if necessary.

For further particulars address the inventor and patentee, W. Haskell King, 561 River street, Troy, N. Y., by whom it was patented, through the Scientific American Patent Agency, on April 25, 1865.

IMPROVEMENT IN THE DISTILLATION OF PETROLEUM OIL.

On page 112, Vol. XII., SCIENTIFIC AMERICAN, we have already described the method and still in general use for refining petroleum oil, by which it will be perceived that a proper distillation can only be obtained when the heat used is perfectly controlled by the operation. The most careful management is required to prevent burning the oil or the still, and if the crude article is allowed to boil too rapidly heavy gases are generated, which will not pass through the pipe leading into the room or condenser, but fall back into the still and incrust it with tar and coke. These incondensable gases, mingling with the oil vapor, also materially affect the color of the distilled article and convert it into an inferior illuminating oil.

In distilling petroleum, the profit of the operation depends very much upon the economy of fuel, and the time required for running off a "charge," and resuming operations with the same still. An ordinary still, having a capacity of one thousand gallons, will require nearly one tun of coal. The boiling point is reached in about four hours, and the "charge," is distilled in from 36 to 48 hours. From four to six hours are subsequently lost in cooling the still for the purpose of removing the tar and coke that has been formed during the process of distillation.

The merchantable product of one thousand gallons of crude oil refined, according to the above method, is as follows :—

Illuminating oil, 65 per cent; naphtha, 15 per cent: tar and coke, 12 per cent; gases, loss, evaporation, 8 per cent.

From this it appears that about twenty per cent of the material is either lost or converted into substances of little value to the refiner.

In August of last year George H. S. Duffus obtained a patent for a still designed to overcome all the difficulties above described. One of these stills has recently been put in operation at the refinery of Messrs. Buckhout & Roberts, at the foot of 106th street, E. R. (Harlem). and others will soon be supplied. It is built entirely of wrought and cast iron; requires no brickwork or chimneys; can be easily transported to any part of the United States, and set up within 24 hours after arriving at its destination. The heat is completely under control of the most ignorant operator, and, within one hour after the fires are lighted, the distillation commences. The heat can be readily raised to any required temperature and retained at a uniform point until the whole charge has been distilled ; then this still can be immediately refilled, and the new distillation commenced, without any material loss of time or heat, for cleaning purposes. Less than two dollars' worth of fuel is required for each charge of oil, which is run off in from 24 to 30 hours. No coke or tar is deposited, and the only residuum yet discovered, after many distillations is about three per cent of heavy oil, which is redistilled and converted into lubricating oil. One thousand gallons of crude oil, refined in the Duffus still, gives the following product:—

Illuminating oil, 80 per cent; naphtha, 15 per cent; heavy oil, 3 per cent; loss (watery evaporation), 2 per cent.

With this improved still, every valuable constituent of the crude oil is obtained in some merchantable form, a result that cannot fail to commend such an invention to the attention of refiners and others interested in distillation. The illuminating oil produced is equal to the best in the market, and exceeds the Government fire test of 115°

KELLY'S BIT FASIENER.

It is very annoying, when withdrawing a bit after a hole has been bored, to have the tool part company with the brace, so that it has to be replaced for every operation. Where many holes have to be bored this

Fig. 2

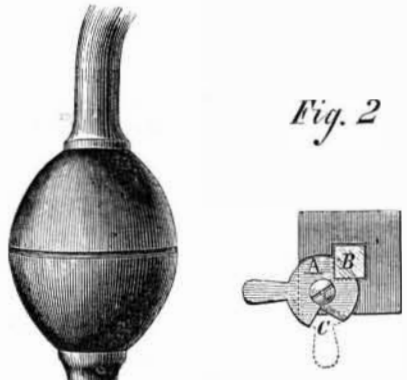
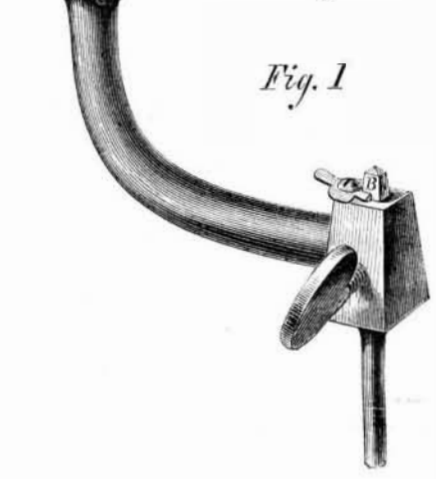


Fig. 1



becomes a serious hindrance, and many plans have been devised to prevent it.

The one here illustrated is a very efficient device for the purpose. It consists simply of a cam-shaped slide, A, fitting in a notch, B, cut in the upper end of the bit shank. By turning the slide so that the notch, C, comes round, the bit can be taken out. The engraving shows the manner of using it very clearly, and it will be seen that it can be applied to any brace at a trifling cost. New goods now in stock can be fitted with this appliance in a short time.

It was patented through the Scientific American Patent Agency by Daniel Kelly, of Grand Rapids, Mich., on Dec 16, 1862. Address him at that place for further information.