INEXPENSIVE ARC LAMP.

BY GEO. M. HOPKINS.

For most experimental uses, and for practical use in connection with the projecting lantern, the simple and inexpensive arc lamp shown in the annexed engraving serves a very good purpose. It requires an occasional adjustment of the carbons to maintain the arc; but this is a matter of little consequence if the lamp is used for a purpose requiring the constant presence of the operator in its vicinity. Should the arc be broken, it may be re-established instantly without careful adjustment of the carbon rods. As will be seen by reference to the engravings, the lamp requires little skill or time for its construction, and the materials of which it is made cost practically nothing.

The experimental lamp shown in Fig. 1 consists of two stout copper wires, say No. 12, each bent to form a

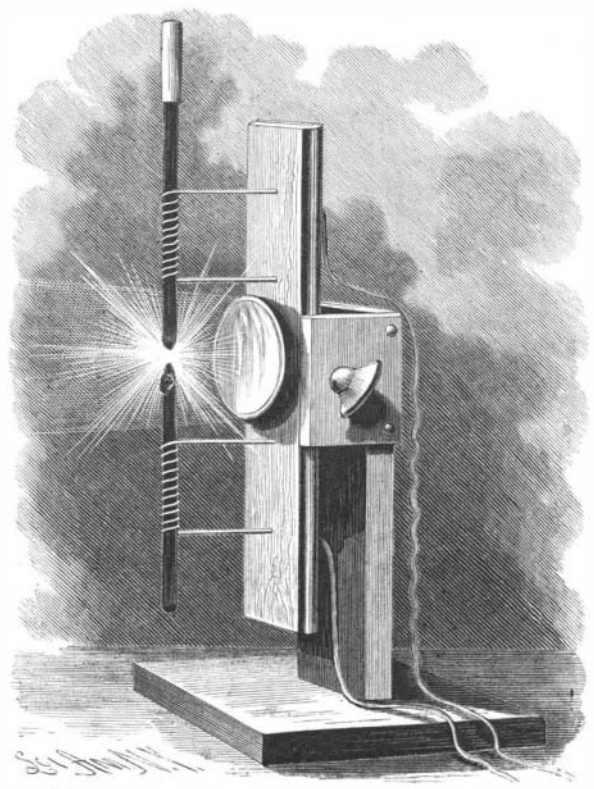


Fig. 2.—SIMPLE ARC LAMP FOR PROJECTION.

helix of sufficient size to readily receive the carbon rod and permit of turning the rod for the purpose of feeding it forward to maintain the arc as its point is consumed. The straight ends of the wire extend in the same direction at right angles to the helix, and are offset and inserted in a board and bent down upon the under side of the board, as indicated by the dotted lines in Fig. 1. The two helices are arranged axially in line, so that the points of the carbon rods will center accurately, and each helix is bowed at its center to secure a spring contact with the sides of the rod.

The electrical connections are made by clamping a copper burr down upon one foot of each helix, and upon the end of one of the conductors.

The outer ends of the rods are inclosed in short pieces of rubber tube, to prevent an electrical contact of the fingers with the rods. This simple lamp has been found very useful in experiments in connection with the eight light dynamo, recently described in these columns. When this lamp is used in connection with a small dynamo like the one referred to, or with a battery, no particular care is necessary in handling it, but it should be used with caution in a circuit conveying a very heavy current. When used in connection with the eight light dynamo, the carbon rods should be five-sixteenths inch in diameter. By turning one or the other of the rods in the helix, it is moved forward or backward, according to the direction in which it is turned; the friction of the carbon in the helix giving the carbon the motion of a screw in a nut. When the arc is broken, it is unnecessary to screw the rod forward and then retract it, to re-establish the arc, as the wire will spring sufficiently to permit of pushing the rod forward to bring the points in contact, and the resilience of the wire will return the carbon to its normal position, thus establishing the arc.

The lamp is adapted to lantern use by grooving the edges of the board and mounting the board between clamping pieces attached to a standard and provided with tongues fitted to the grooves of the board, a screw being inserted in the clamping pieces for drawing them into contact with the edges of the board, as shown in Fig. 2. A small concave reflector is attached to the center of the board, to reflect the light which would otherwise be lost.

The clamping device permits of centering the reflector, and the arc is retained opposite the center of the reflector by the occasional adjustment of the carbons.

AMATEUR MECHANICS.

SIMPLE BACK GEAR FOR FOOT LATHES.

It often happens that the owner of an ordinary foot lathe desires to accomplish work beyond the capacity of his lathe. For example, he may desire to bore an engine cylinder or turn an iron wheel, or turn or bore a large piece of wrought iron or steel. Any of these operations requires slow speed and strong driving, both of which are impossible without back gear or its equivalent; but back gear is expensive, and most foot lathes would not warrant its application.

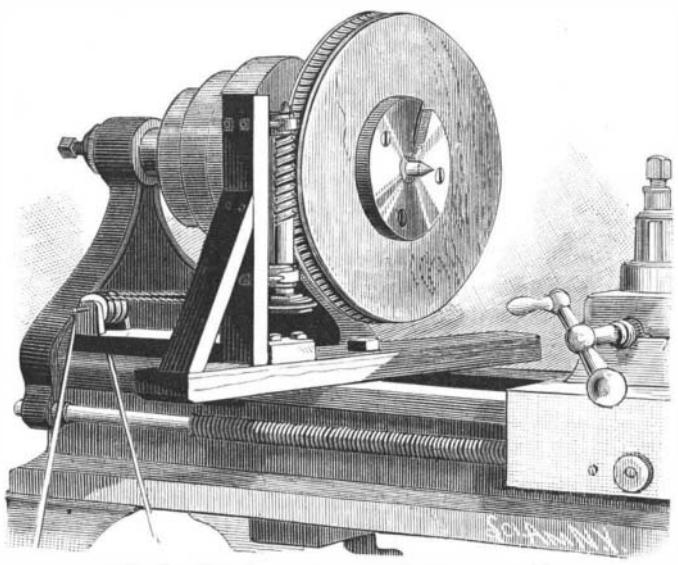
The engraving shows a simple and inexpensive device for securing a slow, strong motion, which is adapted to much heavier work than that commonly done on small lathes. Of course, there is a limit to the size of work possible with a light lathe, even though provided with back gear, the limit being determined by the strength and rigidity of the bed and other parts; but almost any lathe worth possessing should be sufficiently rigid to permit of boring the cylinder of a one horse power engine and doing all of the other work on such an engine, with the exception, perhaps, of boring and turning the flywheel.

The attachment is so simple that little more than a glance at the engraving is required to convey the full idea of its construction and application. To the back of the face plate is secured a disk of hard wood, such as maple, cherry, or mahogany, as large in diameter as can be swung in the lathe. The wood may be fastened to the face plate by means of ordinary wood screws passing through the plate into the wood, or by bolts. Two small straight lag screws, or coach screws, or large wood screws, are selected, one of them to be used as a tangent screw for driving the wooden disk, the other to be fluted like a tap and used for cutting the edge of the wooden disk, so as to convert it into a worm wheel adapted to the tangent screw.

In the edge of the wooden disk is turned a groove, formed on a circular curve of a little greater radius than that of the screw.

The screws are centered in the lathe and trued, and a journal is formed near each end of each screw. A small grooved pulley is fitted to the shank of one of the screws, and the screw is journaled in wooden or metallic boxes, secured by small clips to an upright supported by a cross bar extending across the lathe bed and held in position by a bolt. The screw is now fluted either in the lathe or by means of a file, the flutes being preferably formed on a spiral. The screw is then heated red hot, plunged into powdered prussiate of potash, again heated to a red heat, and finally plunged into cold water. This operation casehardens the iron, so that it will cut the wood without being easily dulled. The fluted screw is now placed in its journal boxes, and a round belt is passed from the drive wheel of the lathe over two small guide pulleys, supported as shown, and around the pulley on the screw.

The screw is rapidly revolved, and the frame by which it is supported is driven forward by the taps of a hammer until the threads engage the periphery of the wooden disk. When the disk has made one revolution, the marks of the screw are examined, and if they coincide where they overlap, the operation is continued by gradually tapping the frame forward until the screw has cut as deeply as possible into the wood, when the fluted screw is replaced by the entire one, and the attachment is complete.



SIMPLE BACK GEAR FOR FOOT LATHES.

Should the threads lack much of coming together after the disk has made one revolution, the disk must be turned down a very little.

The wooden worm wheel should be saturated around its periphery with a heavy oil, or what is better is to rub on tallow and melt it by means of a gas flame or lamp, so that it will be absorbed by the wood.

IT has been computed that the death rate of the globe is 67 a minute, 97,790 a day, and 35,639,835 a year, and the birth rate 70 a minute, 100,800 a day, and 36,792,000 a year.

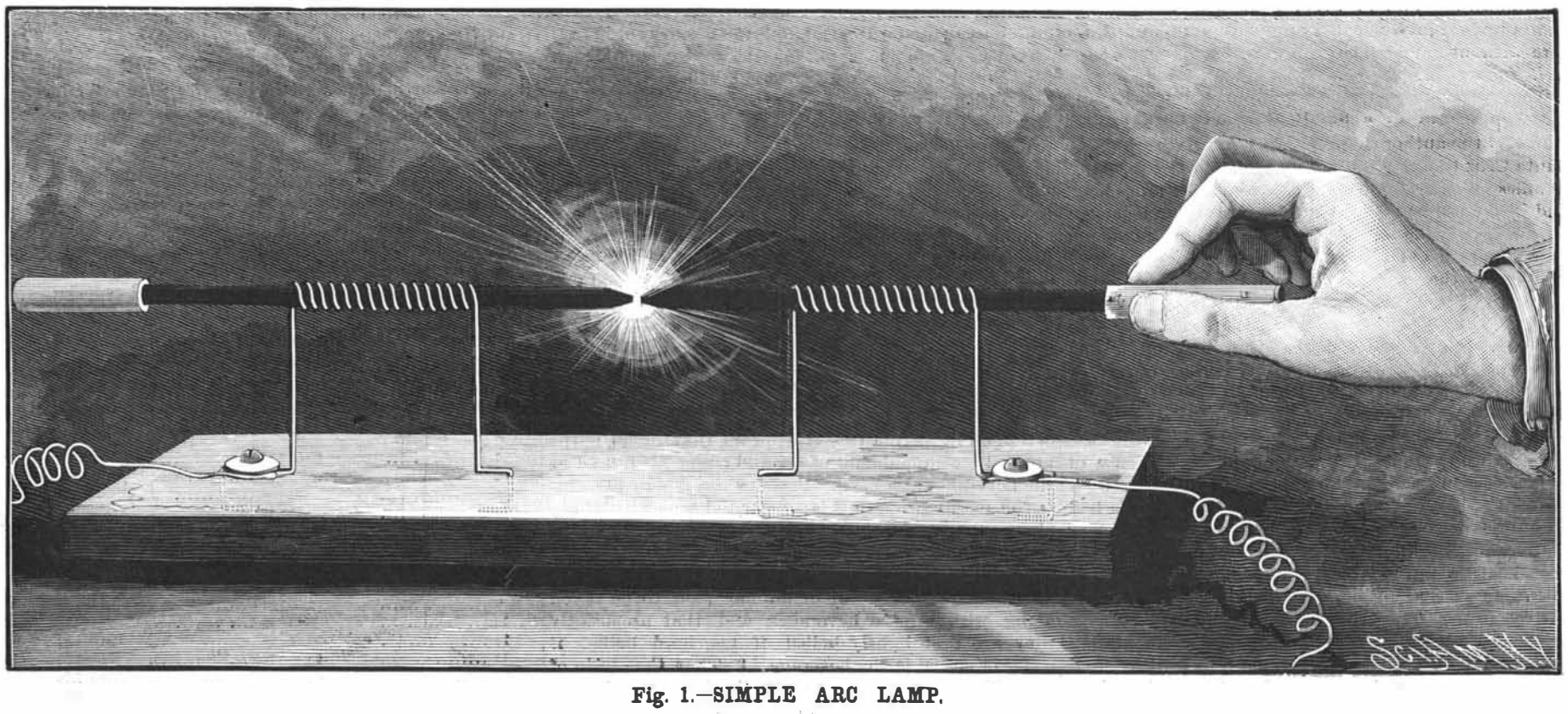


Fig. 1.—SIMPLE ARC LAMP.