

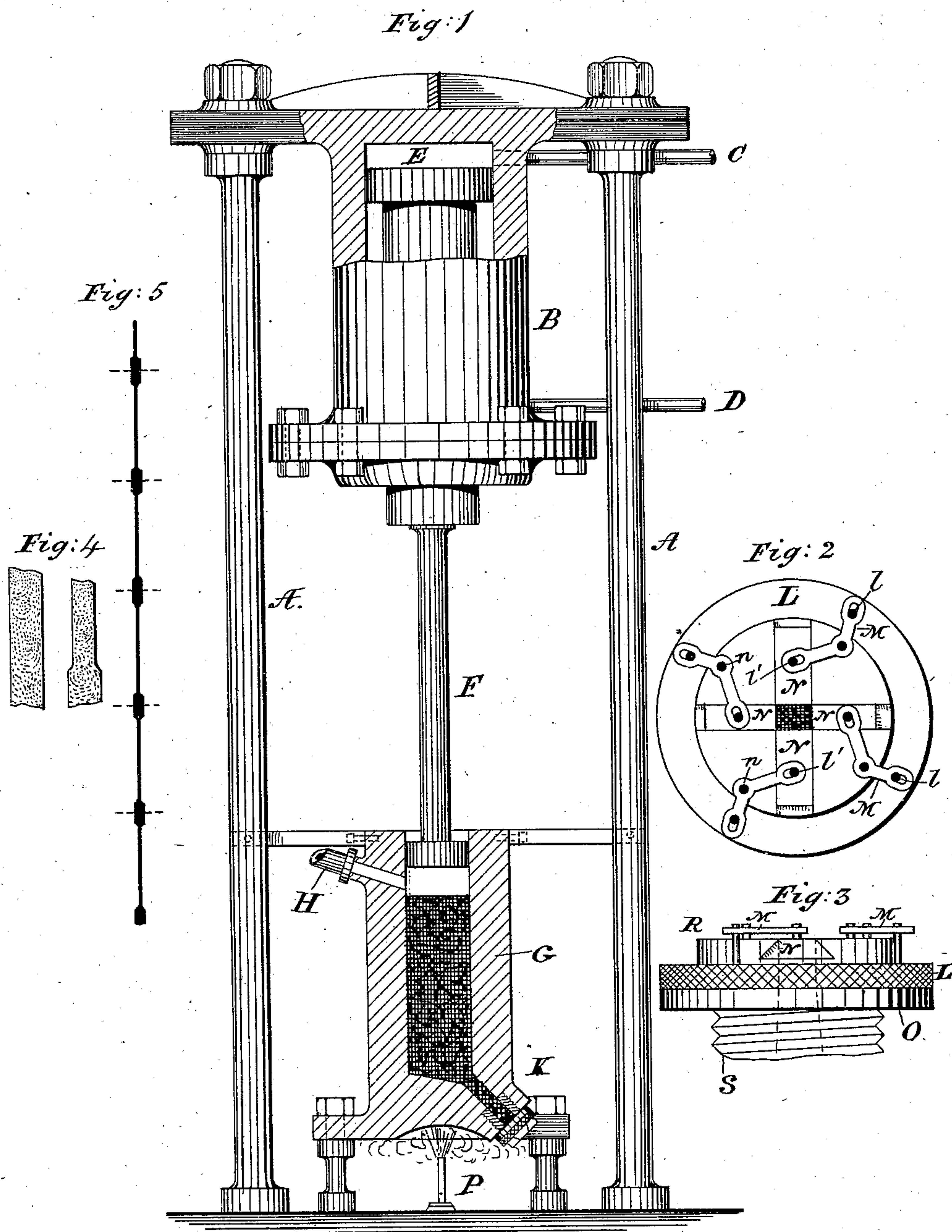
(No Model.)

H. S. MAXIM.

MANUFACTURE OF CARBON CONDUCTORS.

No. 255,309.

Patented Mar. 21, 1882.



ATTEST:

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# UNITED STATES PATENT OFFICE.

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## MANUFACTURE OF CARBON CONDUCTORS.

SPECIFICATION forming part of Letters Patent No. 255,309, dated March 21, 1882.

Application filed August 10, 1881. (No model.)

*To all whom it may concern:*

Be it known that I, HIRAM S. MAXIM, of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in the Manufacture of Carbon Conductors for Electric Lamps, of which the following is a specification, reference being had to the drawings accompanying and forming a part thereof.

My invention relates to a process for producing carbon conductors available for use in incandescent lamps. Such conductors, as is well known, have a slender thread-like stem with enlarged clamping ends. As it is desirable that these strips should all be of exactly the same quality and size, it has been usual to cut them by a die from flat sheets of paper or wood in the form of flat strips with widened ends; but when the plastic carbonizable compounds are used for making the carbon it is very difficult to obtain any considerable number of strips of even approximately the same size and resistance by any of the old methods employed, such as molding and then carbonizing, or by cutting out the strips from a hard mass of carbon. My invention is designed to avoid these difficulties in the manufacture of carbon conducting-strips of an equal width or diameter from plastic compositions; and it consists in a continuous process of forming the said conducting-strips, as will be more fully hereinafter explained.

In the accompanying drawings, Figure 1 is a view of the apparatus complete which I make use of in carrying out my invention, the same consisting in the main of a carbon-press; Fig. 2, a plan of my improved attachment therefor; Fig. 3, a side view of the same enlarged. Figs. 4 and 5 are illustrations of the carbon conducting-strips.

B is an ordinary hydraulic or steam-press cylinder, containing piston E, and provided with pipes C and D for introducing steam above and below the piston.

A is a stout frame-work supporting the cylinder.

G is a cylinder similar in many respects to that of the ordinary pipe-press or the modified form of the same commonly used in the formation of carbon pencils for arc-lamps.

F is a plunger connected with piston E and arranged to work in cylinder G.

H is a pipe or other opening for the intro-

duction into the cylinder G of the plastic material used.

K is a nozzle through which the material is forced. Attached to the nozzle is a die with an adjustable aperture, a convenient form being represented in Figs. 2 and 3, and consisting of a head, R, with screw-threaded portion S, and a flange, O.

L is a ring fitting around the head R, and milled or provided with handles, by which it may be readily turned from side to side.

M are crank-levers pivoted to pins *m* in the stationary head R.

N N are plates capable of a radial movement in the dovetailed grooves in the head R. The levers M are slotted at both ends, by which slots they are connected with the ring L and plates N N, respectively, by means of pins *ll*. The aperture of the die or nozzle is directly in the center of the head R, so that as the plates N are caused to slide in or out the extent of the aperture is varied. The movement of the plates is effected by turning to one side or the other the ring L, by which the levers M are turned and the position of the plates shifted.

The operation of the above-described device is as follows: A quantity of a plastic carbonizable compound of the desired kind is introduced under the plunger in cylinder G through the pipe H. The compound is kept hot and soft by any convenient source of heat, such as a steam-jacket or a burner, P. The ring L is then turned so that the die or nozzle is opened to its full extent and steam introduced above the piston E, causing the plunger F to force out the compound in cylinder G through the die. When a desired amount has been forced out the ring L is turned to reduce the size of the aperture in the die to its smallest area, so that the mixture now issues in a fine thread. When the length of this is equal to that desired for the carbon strip, or a little greater, the ring L is again turned to enlarge the aperture. By this means a continuous strip of the compound is produced, having at given intervals enlargements, and similar in appearance to that illustrated in Fig. 5. As this issues from the press it is cut up in lengths, the points of division being at the middle of the enlargements. The sections will thus be composed each of a slender strip with enlarged ends, and these may then be bent into any desired shaped, packed in sand or in a muffle, and



baked, as in the usual process of manufacturing carbon electrodes.

5 The materials ordinarily employed for making the carbons are finely-powdered graphite or retort carbon and a cohesive substance, such as copal or coal-tar. The ingredients and their proportions, however, may be greatly varied and other compounds known in the art employed with the same results.

10 I would also state that the means for enlarging or contracting the die may also be greatly varied, the form shown being only one of the several which I contemplate using.

15 Instead of turning the ring L by hand, automatic devices may be employed to regulate the size of the die, it being important to observe in the construction and application of such devices that the changes in size of the apertures shall be sufficiently slow to form a  
20 gradual taper from the enlarged to the contracted portions of the conducting-strips.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The improvement in the art of manufacturing carbon conductors for incandescent lamps from plastic carbonizable substances, which consists in forming a continuous strip of alternately enlarged and slender sections, dividing the same into equal lengths, each having an enlargement at the ends, and carbonizing the lengths so formed, substantially as set forth. 25 30

2. The strips for the manufacture of carbon conductors, composed of a plastic carbonizable substance and formed with alternately enlarged and slender sections, as set forth. 35

In testimony whereof I have hereunto set my hand.

HIRAM S. MAXIM.

Witnesses:

PARKER W. PAGE,  
WILLIAM FRISBY.