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Patented July 10, 1900.

C. T. RICHMOND & M. M. ZELLERS.
MACHINE FOR GRINDING CARBON DIAPHRAGMS.

(Application filed July 10, 1899.)

(No Model.)

2 Sheets—Sheet 1.

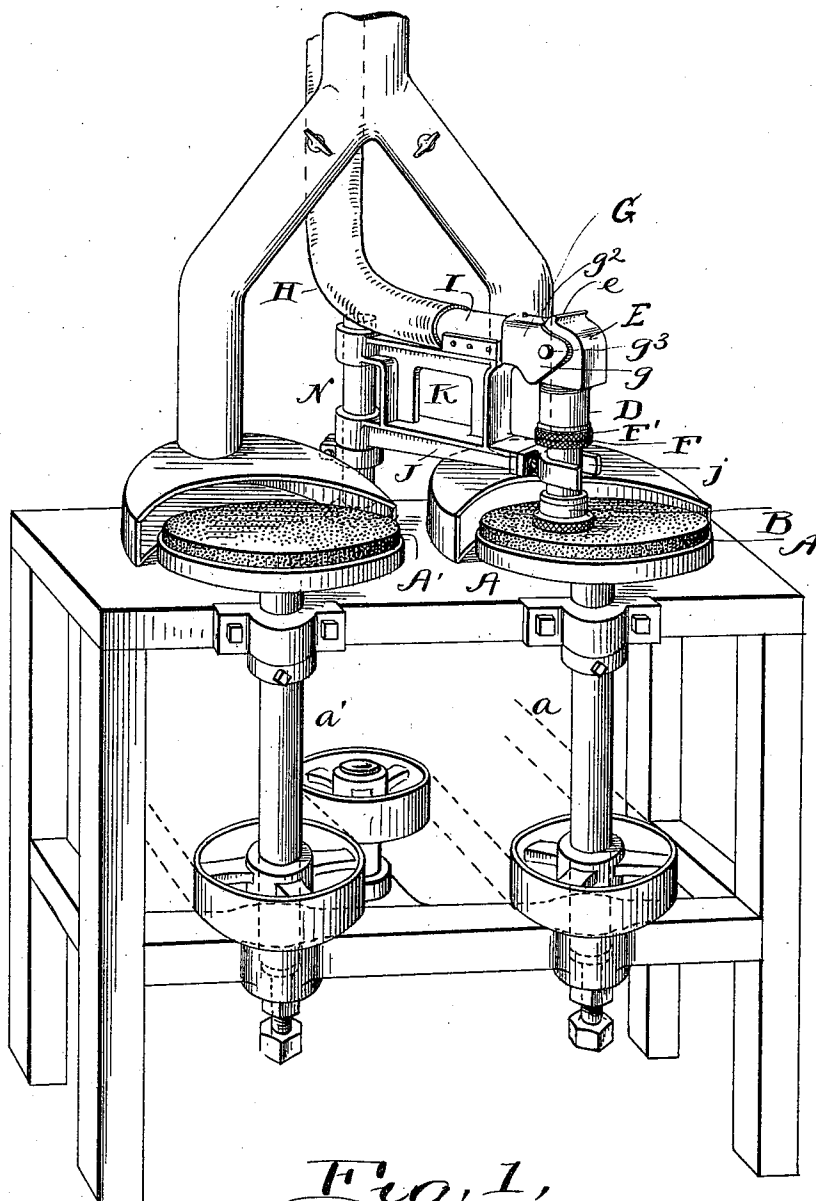


Fig. 1.

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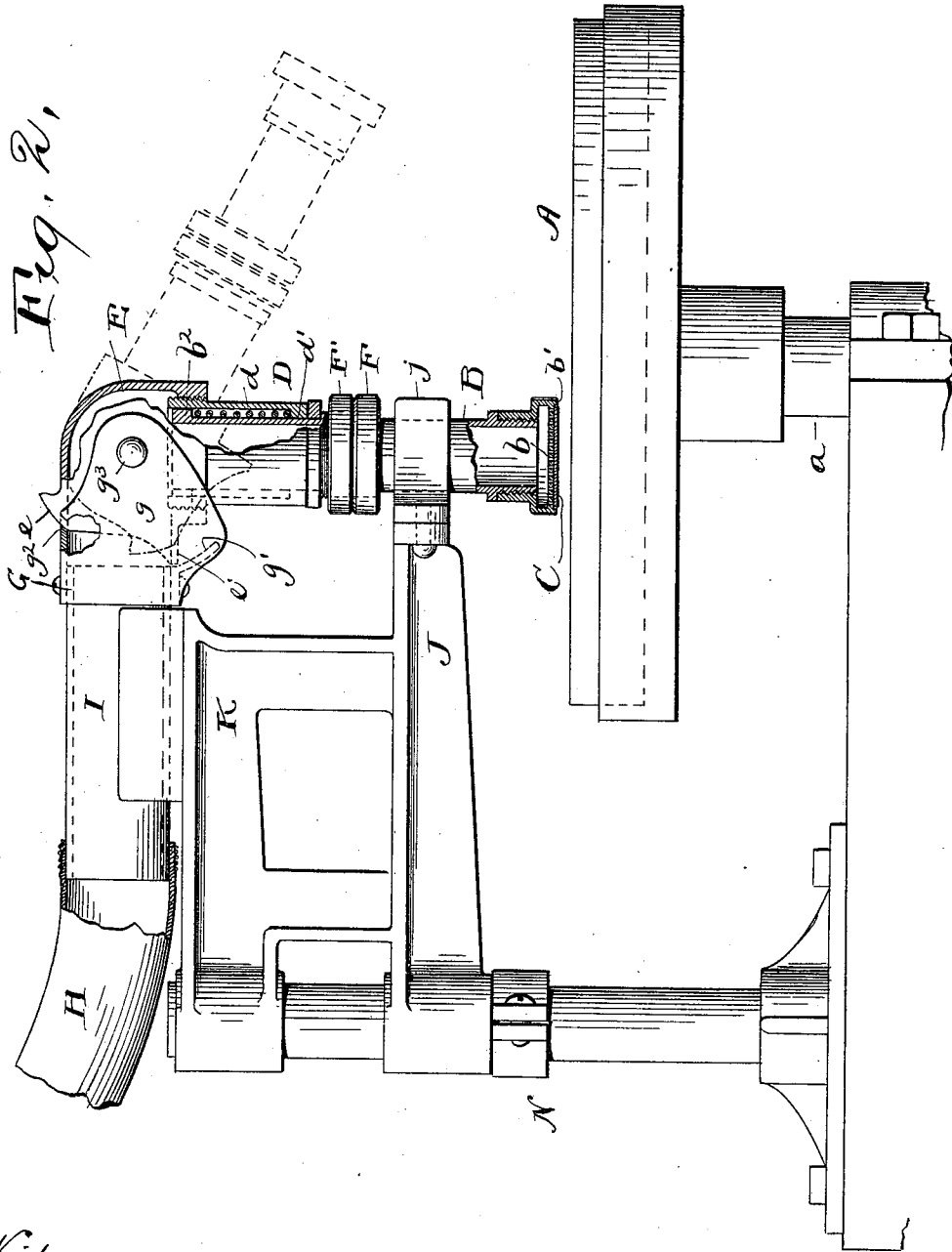
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UNITED STATES PATENT OFFICE.

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ASSIGNORS TO THE NATIONAL CARBON COMPANY, OF TRENTON, NEW
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MACHINE FOR GRINDING CARBON DIAPHRAGMS.

SPECIFICATION forming part of Letters Patent No. 653,531, dated July 10, 1900.

Application filed July 10, 1899. Serial No. 723,356. (No model.)

To all whom it may concern:

Be it known that we, CHARLES T. RICHMOND and MAHLON M. ZELLERS, citizens of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Machines for Grinding Carbon Diaphragms, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

The object of our invention is to provide a machine by means of which the very thin disks or plates of carbon which are used as telephone-diaphragms may be rapidly and economically ground smooth and to any desired thickness. It will be clear, however, from the following description that the machine is adapted for use, either in the precise form shown or in some modified form, for grinding thin plates of other shapes made of other material and adapted for other uses.

The invention consists in the construction and combination of parts hereinafter described, and definitely pointed out in the claims.

In the drawings, Figure 1 is a perspective view of a machine embodying our invention. Fig. 2 is a side elevation, partly in section, of the upper part of said machine wherein our invention is found.

Referring to the parts by letters, A represents a grinding-wheel which is secured upon the upper end of a vertical rotatable shaft *a*. The top horizontal surface of said wheel is the grinding-surface which is designed to be utilized in this machine.

B represents a pneumatic holder by means of which the very thin plates or disks will be held for grinding. This holder is a tube having across its lower end a perforated plate *b*. At or near the margin of this perforated plate is the downwardly-extended flange *b'*. The height of this flange must be less than the thickness of the finished disks. The upper end of the holder is connected with a suction-fan or other vacuum-producing device by means of which the air is drawn up through the holder, whereby a thin plate of carbon or some like article large enough to cover all of the perforations in the plate *b* will be held against said plate. This holder is vertically movable in a tube D, which is secured to a

hood E. Within the tube D and around the holder B is a coiled spring *d*, which thrusts endwise against an internal annular flange *d'* on the tube D and an external annular flange *b''* on the holder B, whereby the latter is lifted to substantially the position shown in Fig. 2. The holder B is or may be externally threaded, and two nuts F F', which act reciprocally as jam-nuts, are screwed upon this threaded portion. When the holder is in its vertical operative position it, passes between the forks *j* of an arm J, and when the holder has been moved down as far as it ought to be moved to grind the disks to the desired thickness the nut F engages with these forks and prevents further downward motion.

I represents a horizontal tube which is made fast to the swinging frame K, of which the arm J is a part, and it has a head G secured to its forward end. This head is substantially rectangular in vertical transverse section, having the two parallel side wings *g g*. The hood E has parallel sides which fit between these wings and are pivoted thereto on the horizontal transverse pivot *g''*. The upper and lower front ends of the head and the upper and lower rear ends of the hood are shaped so that when the holder is vertical, or nearly so, these ends engage and put the head and hood into communication with each other, whereby when the air is drawn through the head it must for most part be drawn through the hood and holder. When a disk C is covering the perforations in plate *b*, a partial vacuum is created in the holder, by which the disk is held against said plate *b*. The engaging ends of the hood and head are shaped as follows, viz: The head has an arc-shaped wing *g'* on its lower front edge, with which the lower rear edge *e'* of the hood engages, while the hood has on its upper rear edge an arc-shaped surface *e*, with which the upper rear edge *g''* of the head engages.

When the structure, consisting of the hood E, tube D, and holder B, is swung on its pivot toward the position shown in dotted lines in Fig. 2, these surfaces on the head and hood, respectively, are caused to disengage, whereby the front end of the head is opened for the passage of air. This relieves the vacuum in the holder, whereupon the disk C drops off. Another disk is placed against the plate *b* and

held there while the holder is swung down toward the vertical position; but before it reaches said position these surfaces g' g^2 e' e^2 on the head and hood again engage, and a partial vacuum is again created in the holder. The holder is then moved down by the operator in opposition to the spring d , which brings the disk C against the revolving grinding-wheel A, and he continues to move it down until further downward movement is impossible by reason of the engagement of the stop F with the fork j , at which time the grinding operation is completed. The flange b' prevents the disk from being dragged from the holder by the grinding-wheel.

In machines of this character it is desirable to be able to use either one of two grinding-wheels, one of which may be coarser than the other. A second grinding-wheel A' is shown in Fig. 1 secured upon a second vertical shaft a' . The frame K, which supports the parts heretofore described, is mounted upon a vertical standard N in such manner that it may turn upon said standard as an axis. The standard is erected behind and about midway between the grinding-wheels, wherefore the holder may by swinging the said frame be brought above either of said wheels which may be used to grind the disks.

It has not been thought necessary to show the air-exhausting mechanism. Any suitable mechanism, such as a suction-fan, may be used. With the particular construction of the grinding-machine as shown it is necessary that it be operated continuously, although means might be provided without departing from the invention for stopping and starting the air-exhausting device at will.

Having described our invention, we claim—

1. The combination of a rotating grinding-wheel, a pneumatic holder having a head-tube and a mouth-tube telescoping therewith, and adapted to be moved longitudinally toward and from the grinding-wheel, substantially as and for the purpose specified.

2. The combination of a rotating grinding-wheel, a tubular holder having across its mouth a perforated plate, said tubular holder having an upper tube and a lower mouth-tube telescoping therewith, said tubes having annular shoulders and a spiral compression-spring lying between said shoulders, and normally keeping the perforated mouth-plate withdrawn from the said grinding-wheel, and means for exhausting the air from the tubular holder, substantially as and for the purpose specified.

3. The combination of a rotating grinding-wheel, a tubular holder movable longitudinally toward and from said wheel and having across the end adjacent to the wheel a perforated plate, and means for withdrawing air from said tubular holder through the other end thereof, said plate having a flange outside of the perforations, substantially as and for the purpose specified.

4. The combination of a rotating grinding-wheel, a tubular holder movable longitudinally toward and from said wheel and having across the end adjacent to the wheel a perforated plate, and means for withdrawing air from said tubular holder through the other end thereof, an adjustable stop-nut on said holder, and a stop-arm with which it is adapted to engage, substantially as and for the purpose specified.

5. The combination of a rotary grinding-wheel, and a pneumatic holder adapted to be swung upon a horizontal axis, which holder has across the end adjacent to the grinding-wheel a perforated plate, and connections between the upper end of said holder and an air-exhausting device, substantially as and for the purpose specified.

6. The combination of a grinding-wheel, with a tubular holder which is movable longitudinally and about a pivot and has at its free end a perforated plate, and connections between the air-exhausting device and the holder, substantially as and for the purpose specified.

7. The combination of a grinding-wheel, with a tubular holder which is movable longitudinally and about a pivot and has a perforated plate at its free end, with an air-exhausting device and means whereby the swinging of said holder in one direction connects said holder with said device, and the swinging of said holder in the other direction breaks said connection, substantially as and for the purpose specified.

8. The combination of a rotary grinding-wheel with a vertically-movable tube having a perforated plate across its free end, a hood which is connected over the other end of said tubular holder, a pipe I suitably connected with an air-exhausting device, a head secured thereto, said head and hood being pivoted together and having surfaces which engage with each other and establish a close communication between the hood and head when the holder is in a vertical position and which are disengaged to break said communication when said holder is swung about said pivot away from the vertical position, substantially as and for the purpose specified.

9. The combination of a plurality of rotating grinding-wheels, and a swinging frame, a pneumatic holder carried by said swinging frame and longitudinally movable toward the faces of the grinding-wheels, said grinding-wheels all lying within the radius of said swinging frame, whereby the swinging frame may bring the holder over any grinding-wheel, substantially as and for the purpose specified.

In testimony whereof we hereunto affix our signatures in the presence of two witnesses.

CHARLES T. RICHMOND.
MAHLON M. ZELLERS.

Witnesses:

H. E. HACKENBERG,
E. H. WHITLOCK.