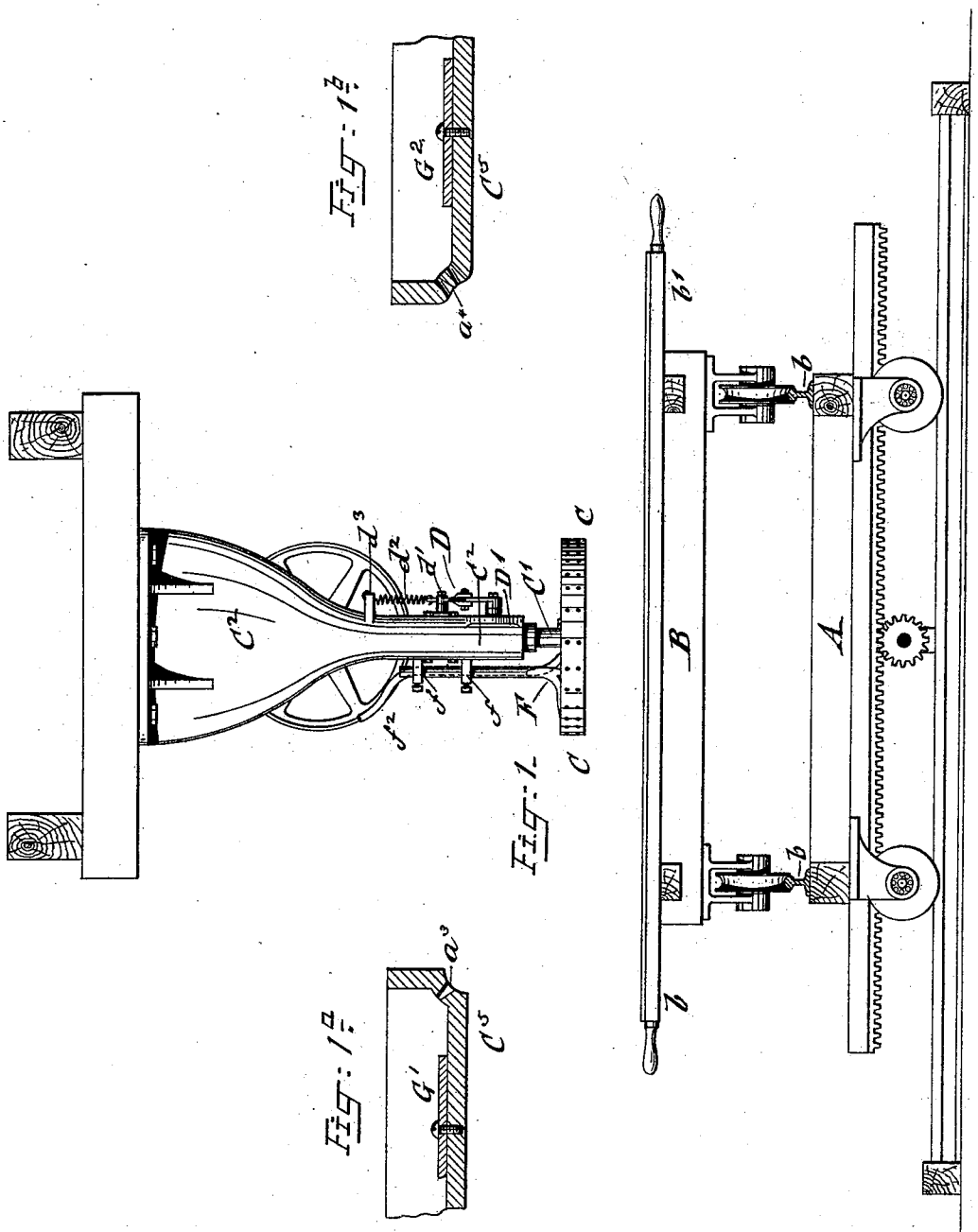
(No Model.) 3 Sheets—Sheet 1.

J. W. BIRKENSTOCK.

MACHINE FOR POLISHING MARBLE OR GRANITE.

No. 510,832. Patented Dec. 12, 1893.



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J. W. BIRKENSTOCK.

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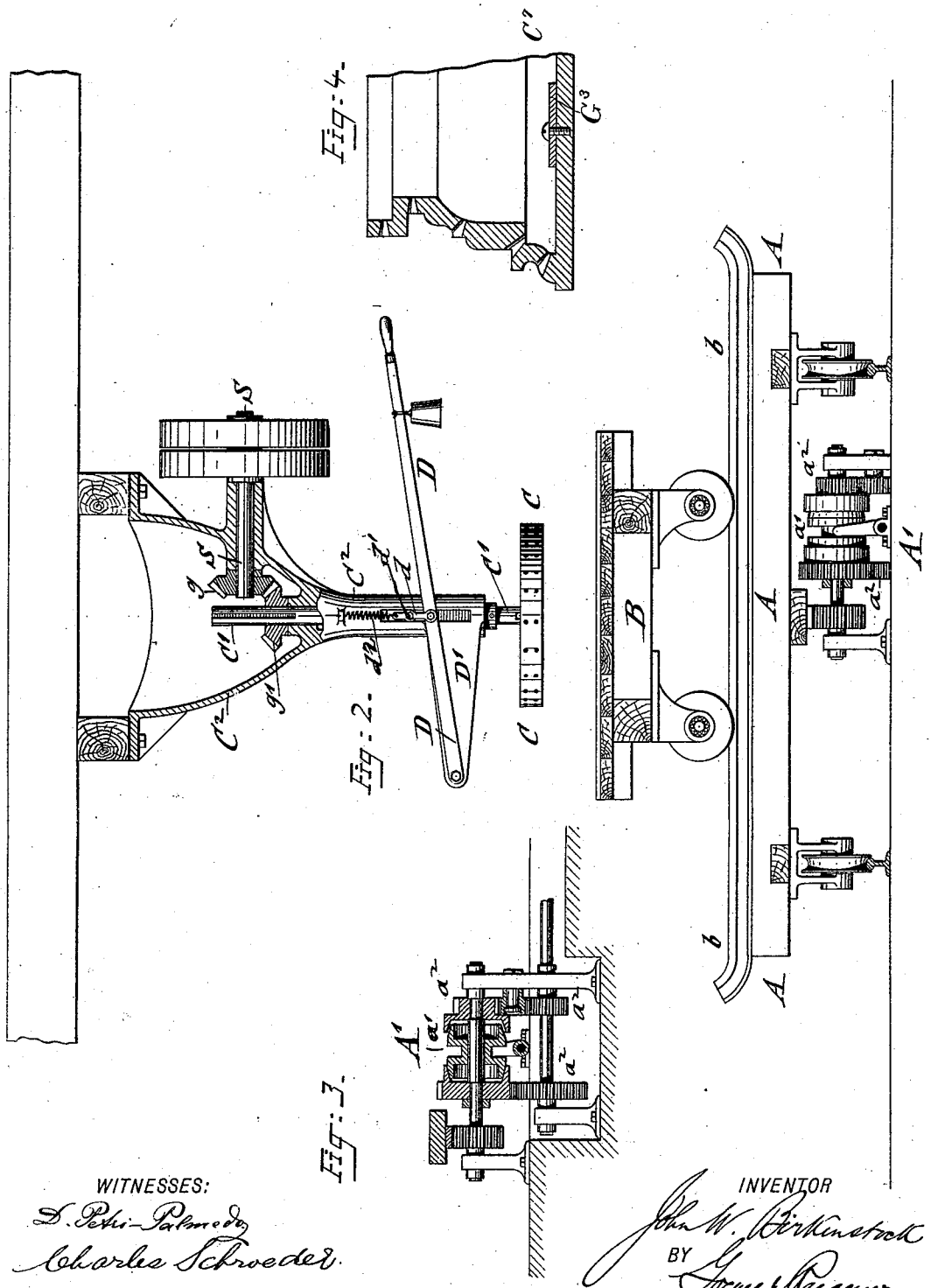

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(No Model.) 3 Sheets—Sheet 3.

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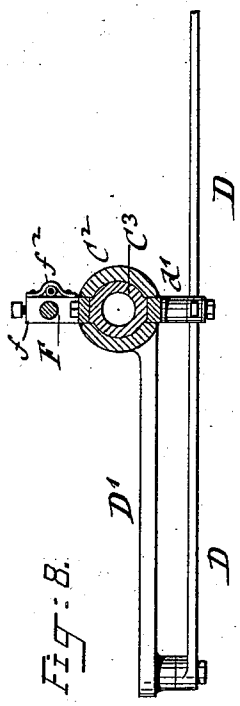

Fig. 8.

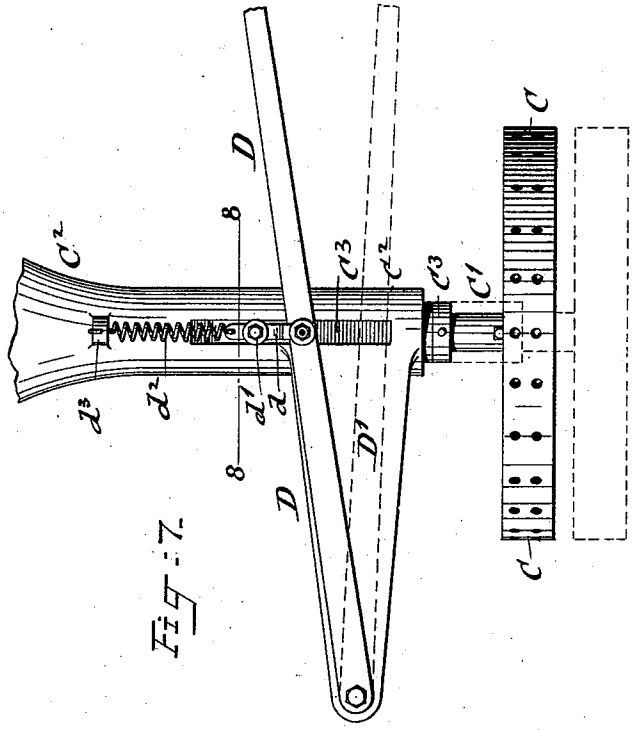

Fig. 7.

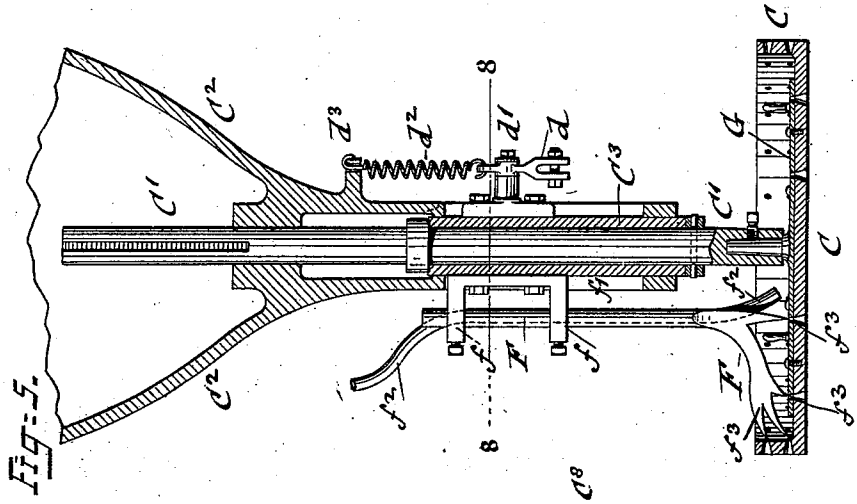

Fig. 5.

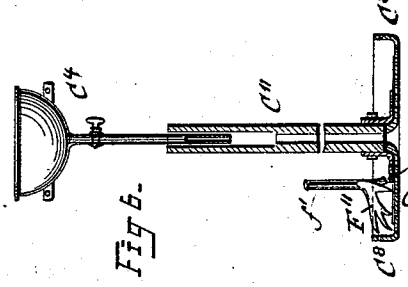

Fig. 6.

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UNITED STATES PATENT OFFICE.

JOHN W. BIRKENSTOCK, OF NEW YORK, N. Y.

MACHINE FOR POLISHING MARBLE OR GRANITE.

SPECIFICATION forming part of Letters Patent No. 510,832, dated December 12, 1893.

Application filed May 12, 1893. Serial No. 473,932. (No model.)

To all whom it may concern:

Be it known that I, JOHN W. BIRKENSTOCK, a citizen of the United States, residing in the city, county and State of New York, have invented certain new and useful Improvements in Machines for Polishing Marble or Granite, of which the following is a specification.

This invention has reference to an improved machine by which the surface of marble-slabs and the molded edges of the same are polished in a quick and effective manner, so that a considerable saving in time and labor is obtained; and the invention consists of a machine for polishing marble slabs and the molded edges of the same, which comprises a main-truck that is moved over fixed rails, an auxiliary-truck that is moved on the rails of the main-truck in a direction at right angles to the motion of the main-truck, and a polishing head that is suspended by a suitable hanger and that is rotated on its axis by suitable mechanism, said head being applied to the work by a weighted lever. The polishing head is provided with openings in its bottom, through which the water and polishing material pass on to the slabs to be polished, while a scraper is arranged in the head and provided with tapering points that pass over the openings in the head so as to keep the same open for the passage of the polishing material. A disk-valve is applied to the inside of the head, and provided with openings, said valve being adapted to be shifted on its axis, so as to produce the partial or entire opening or closing of the supply-orifices according as the work is to be retarded or entirely interrupted. The polishing head is provided with a circumferential flange, which is also provided with orifices and made to correspond in shape to the molded edges of the slab to be polished, as will be fully described hereinafter and finally pointed out in the claims.

In the accompanying drawings, Figure 1 represents a side-elevation of my improved machine for polishing marble-slabs and the molded edges of the same. Figs. 1^a and 1^b are detail sections of different forms of the head. Fig. 2 is also a side-elevation partly in section, at right angles to Fig. 1. Fig. 3 is a detail-section of the driving gear and clutch for the main-truck. Fig. 4 shows still another form of head. Fig. 5 is a vertical central section of the polishing head drawn on a larger scale. Fig. 6 is a modified form of polishing head and shaft. Figs. 7 and 8 are respectively a side-elevation of the polishing head and a horizontal section of the same, on line 8 8, Figs. 5, and 7, also on a larger scale.

Similar letters of reference indicate corresponding parts.

Referring to the drawings, A represents the main-truck, which is supported on fixed rails attached to suitable timbers of the floor. Motion in forward and backward direction is imparted to the main-truck A by a suitable power-transmitting mechanism A′, which is provided with a friction-clutch a' and reversing gear a^2, so that the motion of the truck can be readily changed from one direction to the other. On the main-truck are supported, rails b with turned-up ends, and on the rails is arranged a second auxiliary-truck B which is moved over the rails b of the main-truck by means of suitable handles b' at the ends of the truck, as shown in Fig. 1, so that by means of the main and auxiliary-trucks, the marble-slab that is supported on the top of the auxiliary-truck B, can be readily moved in any suitable direction, so as to be subjected on any part of its surface to the action of a polishing-head C. The head C is located at the lower end of a shaft C′ which is stepped in a hanger C^2 that is attached in a permanent manner to the timbers of the ceiling. Rotary motion is transmitted to the shaft C′ of the polishing-head C by means of a driving shaft S and bevel gears g g' located respectively at the inner end of the shaft S and the upper end of the shaft C′. The polishing head C is counterbalanced by means of a lever D which is fulcrumed to a bracket-arm D′ of the lower tubular portion of the hanger C^2, the lever being connected by a pivot-link d with a pin d' on the shaft C′ and a helical spring d^2 with a fixed projection or eye on the hanger C^2, so that the polishing-head can be raised or lowered within certan limits. The lever D is weighted at its outer end, the weight balancing the head C and its shaft C′. The pin d' is passed through a slot in the tubular portion of the hanger C^2 and attached to a guide-sleeve C^3 in the same, as shown clearly in Fig. 5. The transmitting bevel-wheel g', at the upper end of shaft C′ is splined to the shaft and

supported on a step of the tubular portion of the hanger, so that the shaft C′ can be moved up and down in the hub of the bevel-wheel g' in following the ascending and descending motion of the polishing-head, without interrupting the rotary motion of the same, as transmitted by the driving shaft S and bevel-wheel g.

The polishing-head is composed of a suitable composition metal, which can be readily cast into proper shape and provided with a circumferential plain or molded rim, the bottom and rim being provided with apertures for the passage of the polishing material employed for the polishing operation. The polishing-head C is attached at its center by a socket and screw connection to the lower end of the shaft C′. The shape of the circumferential rim of the polishing-head C has to correspond to the shape of the molded edge of the slab, so that the edge can be readily polished by the rim of the head C. The sleeve C^3 which supports the shaft C′ of the polishing-head C is provided with a bracket f which passes through a slot F′ in the lower tubular portion of the hanger, said bracket serving to support a supply-pipe f^2 for the polishing solution. The polishing solution is supplied to the interior of the head and fed through the apertures of the same, to the surface of the slab to be polished. The brackets f also support the shank of a scraper F which is provided at its lower end with a number of branching points f^3, that extend close to the apertures in the polishing-head. The points of the scraper F serve for keeping the apertures of the polishing-head open during the rotary motion of the same, which is accomplished by the passage of the scraper-points over the inner ends of the apertures of the head. The shape of the scraper F is adapted to the size of the polishing-head and to the location of the apertures in the bottom and rim of the head, a different shape of the polishing-head requiring also a corresponding construction of the scraper. To the inside of the polishing-head C is applied a disk-shaped valve G, which has apertures that correspond to the apertures in the bottom of the polishing-head, said valve being adapted to turn on its axis so as to open partly or entirely or close partly or entirely the apertures in the bottom of the polishing-head, and regulate the supply of the polishing solution or the entire discontinuance of the same, as desired. The disk-valve G is provided with handles for shifting it and with set screws for securing it into open or closed position.

In the modification illustrated in Fig. 6 the shaft C″ of the polishing head C^8 is made hollow so as to form a passage which connects at its lower end with a central opening in the head and at the upper end with a stationary funnel C^4, having a regulating stop-cock in its neck, as shown in Fig. 5, said stationary funnel and central channel serving to supply the acid required for the polishing operation in a very convenient and regulated manner. The head C^5 shown in Fig. 1^a has a circumferential groove a^3 at its outer edge and the apertures for supplying the polishing acid are arranged diagonally and open into said groove. G′ represents a disk-shaped valve for regulating the supply of the polishing solution. The head C^6 shown in Fig. 1^b has a circumferential groove a^4 having rounded edges and apertures opening therein. G^2 represents the disk-shaped valve for controlling the flow of polishing solution.

The modification shown in Fig. 4 illustrates an elongated head C^7 in the shape of a molding having apertures arranged throughout the length thereof. G^3 represents the disk-shaped valve for regulating the supply of polishing solution.

The operation of my improved machine for polishing marble-slabs is as follows:—The slab is placed in position on the top part of the auxiliary-truck B, and the polishing-head C is then lowered by means of its weighted lever D until its bottom comes in contact with the surface of the slab. The rotary motion of the polishing-head is then started and the supply of water and polishing material to the interior of the head and through the feed-apertures of the same to the slab kept up. The slab is moved below the rotary polishing-head in any required direction, by means of the main and auxiliary-trucks, until the entire surface of the slab is evenly polished, care being taken that the polishing head is applied to the entire surface of the slab. When the surface of the slab is polished, the motion of the slab is interrupted, and the slab then placed in such a position toward the polishing-head that the straight or molded rim of the same can be applied to the edge of the slab, and the edge subjected to the polishing action of the rim of the head. For this purpose, the head has to be lowered still more by the weighted lever. It is accomplished by moving the weight on the lever toward the hanger. When the slab is placed in proper position toward the molded rim of the head, the head is rotated again and the edge of the slab kept in contact with the rim until it is entirely and evenly polished.

By my improved machine, the polishing of marble and other slabs of all kinds and sizes, and of the molded edges of the same, can be accomplished with great facility and at a considerable saving of time and labor, as it only requires a number of polishing-heads having different shapes of rims, so that the polishing of molded edges of slabs can be readily and quickly accomplished after the surface-polishing of the same is completed.

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

1. The combination, with a support for the slabs to be polished, of an apertured head having a circumferential rim, a shaft for supporting the polishing head, means for trans-

mitting rotary motion to the shaft, a weighted lever connected with the shaft for counterbalancing the head and shaft, a tube for supplying water and polishing material to the head, and a fixed scraper having branching points for clearing the apertures of the head, substantially as set forth.

2. A rotary head for marble-polishing machine, provided with a circumferential rim and apertures in the bottom and in the rim, a tube for supplying water and polishing material to the interior of the head, and a fixed scraper having branching points extending to the apertures of the head, so as to keep them clear for the passage of the polishing material, substantially as set forth.

3. The combination, with a rotary polishing-head having apertures in its bottom, of a shaft for supporting said head, and a valve having openings registering with the apertures of the head and adapted to open or close the same, a tube for supplying water and polishing material to the interior of the head, and a scraper having branching points for clearing the apertures of the head, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

JOHN W. BIRKENSTOCK.

Witnesses:
PAUL GOEPEL,
H. WILLARD GRIFFITHS.