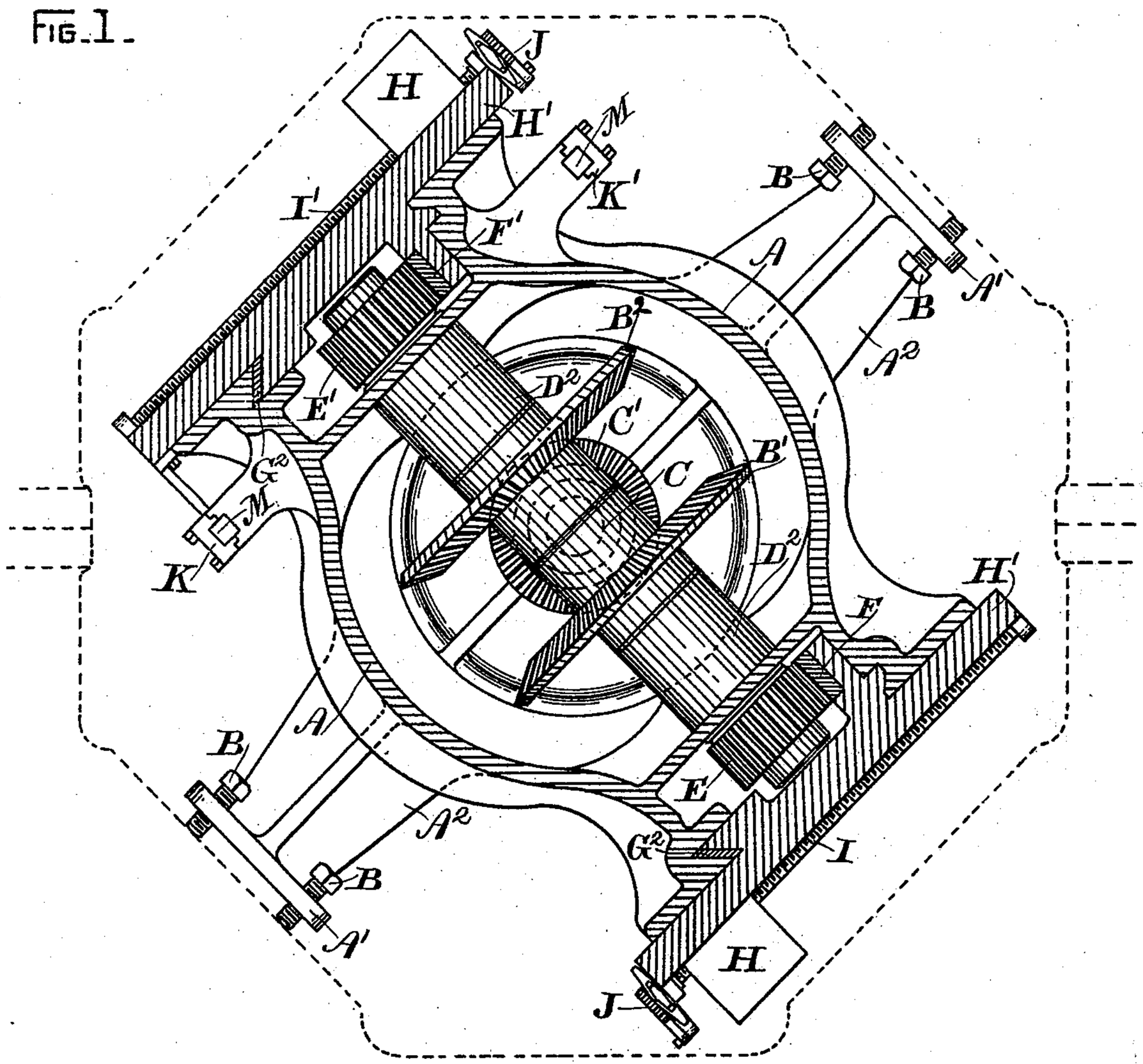
(No Model.) 3 Sheets—Sheet 1.

H. B. HUGHES.

PORTABLE PLANER.

No. 516,815. Patented Mar. 20, 1894.

FIG. 1.



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(No Model.)

3 Sheets—Sheet 2.

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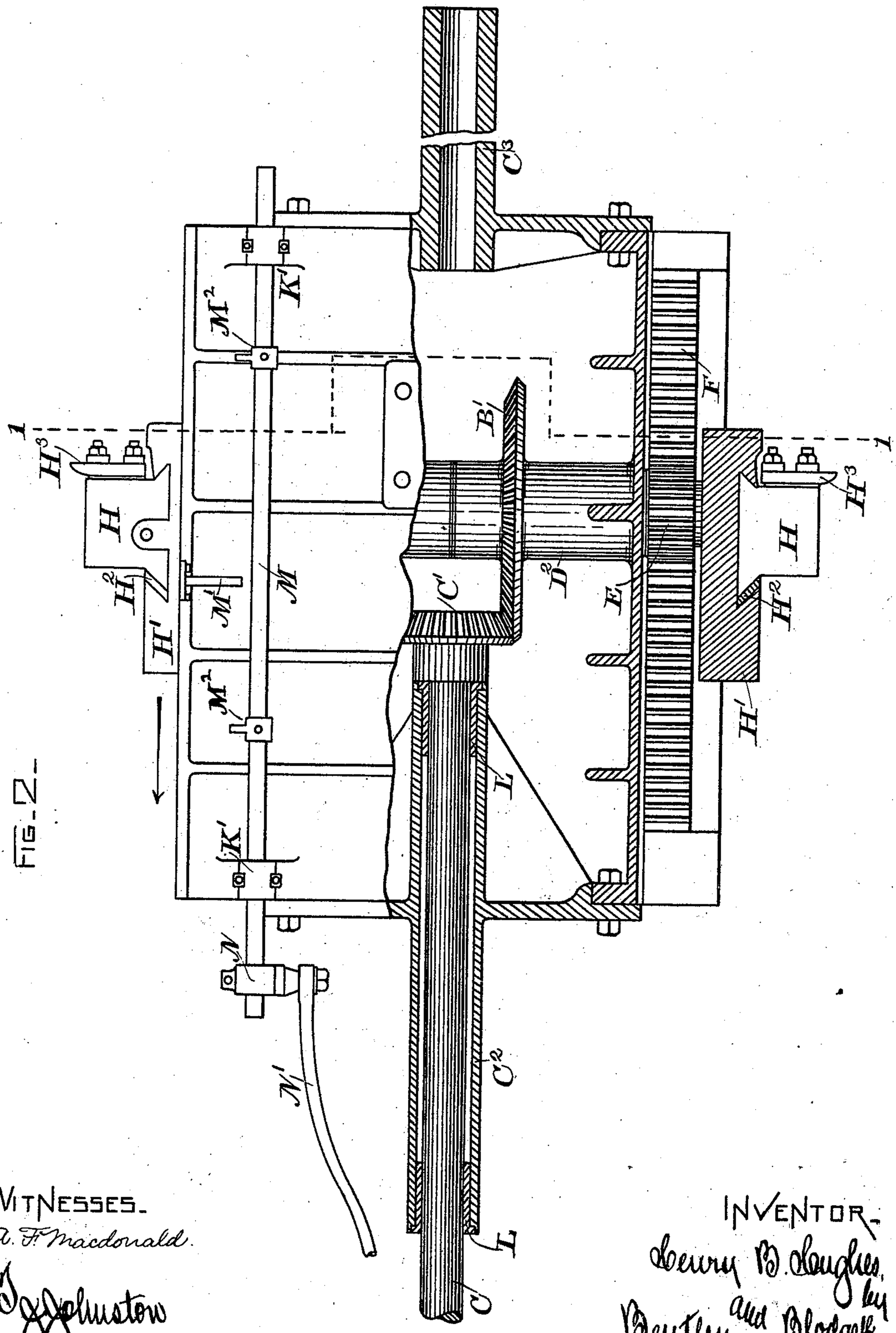

FIG. 2.

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(No Model.)

3 Sheets—Sheet 3.

H. B. HUGHES.

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FIG. 4.

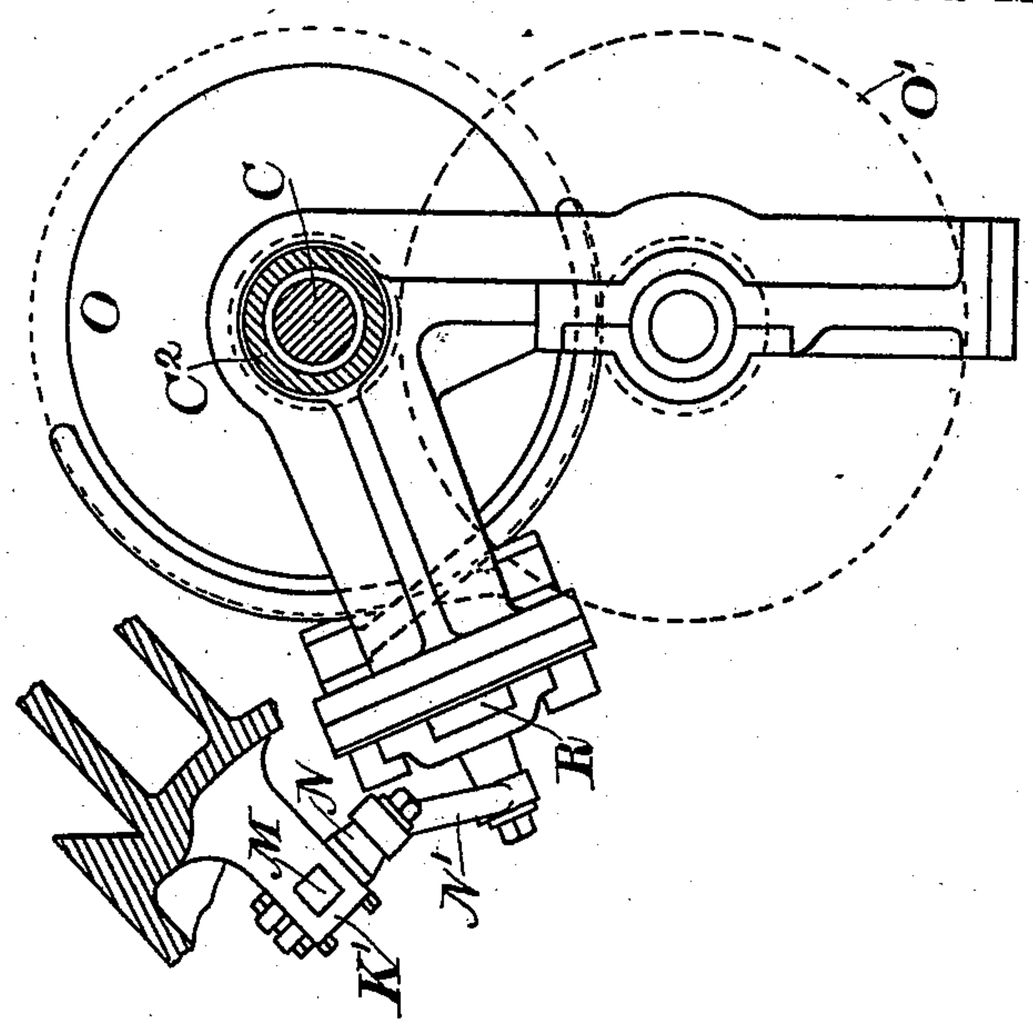
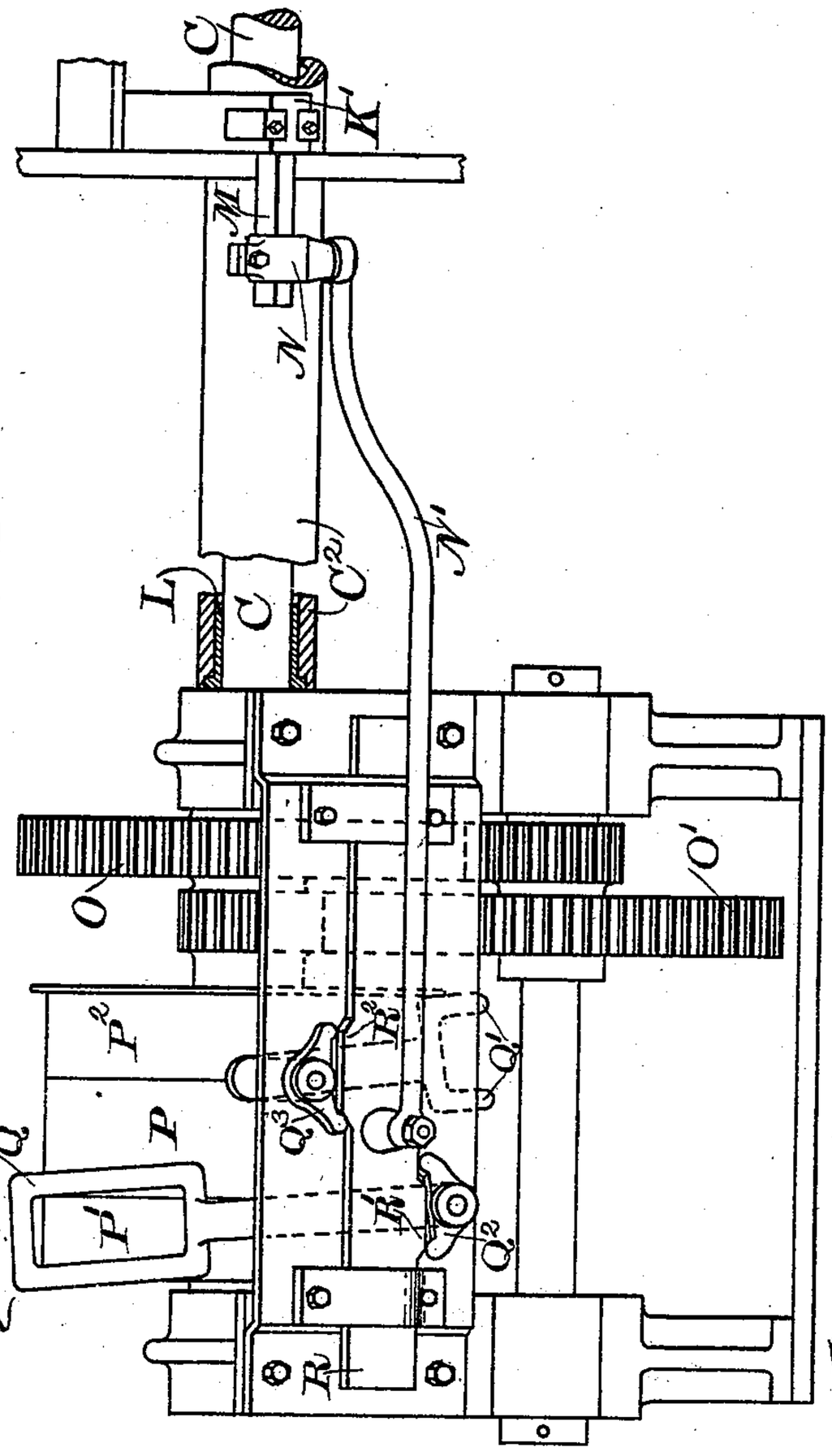


FIG. 3.



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UNITED STATES PATENT OFFICE.

HENRY B. HUGHES, OF SCHENECTADY, NEW YORK, ASSIGNOR TO THE GENERAL ELECTRIC COMPANY, OF BOSTON, MASSACHUSETTS.

PORTABLE PLANER.

SPECIFICATION forming part of Letters Patent No. 516,815, dated March 20, 1894.

Application filed November 7, 1893. Serial No. 490,320½. (No model.)

To all whom it may concern:

Be it known that I, HENRY B. HUGHES, a citizen of the United States, residing at Schenectady, in the county of Schenectady and State of New York, have invented a certain new and useful Improvement in Portable Planers, of which the following is a specification.

My invention relates to apparatus designed to finish the pedestal seats upon the frame of the dynamo electric machine; I prefer to call it a portable planing apparatus because the principles upon which it works are substantially the same as those of the planing machine.

It is well known that the frame of a dynamo-electric machine is exceedingly awkward and inconvenient to handle and to secure in position upon the bed plate of a planing machine as ordinarily constructed. In such machines the field-magnet cores are ordinarily cast or made separate from the frame, which is usually of cast iron and is provided with beds or seats for the field-magnet cores which must be finished to a true surface; in the ordinary four-pole type of multipolar machine, or in any other multipolar machine having an even number of poles, the seats for diametrically opposite field-magnet cores must be truly parallel in order to preserve the magnetic symmetry of the machine; the frame being usually cast in two pieces which are separately finished and afterward bolted together, the seats for opposite cores come on different pieces and are difficult to finish properly.

It is to obviate the objections named that I have devised my present invention, which consists of an apparatus which may be mounted in the bearings of the dynamo-electric machine and driven by a shaft rotating therein, which shall operate cutting tools to finish those seats or beds upon the frame; the frame of the apparatus being provided with means for centering so that the work will be finished up "true," and the apparatus is designed to be used after the two parts of the frame are fitted together.

In the accompanying drawings, hereby referred to and made part of this specification, Figure 1 is a side elevation partly in section upon the line 1—1 of Fig. 2 of my improved portable planer. Fig. 2 is a plan, partly broken away and partly in section. Figs. 3 and 4 are a side elevation and end view respectively of the feed and stop mechanism.

Like letters refer to like parts throughout.

A is the frame of the machine, provided with centering arms, A^2 A^2; each arm has at its end a flange A′ through which project lag-screws B B, &c., by the rotation of which the frame may be truly centered.

C is a central shaft carrying a bevel gear C′ and rotating within a sleeve C^2, being supported clear from it by the bushings L L, which serve as bearings to the shaft. Upon the other side of the frame is a similar sleeve C^3; a solid projection may take the place of the sleeves C^3, if desired. The two sleeves are designed to rest in the bearings of the dynamo-electric machine and form a firm support for the frame, in conjunction with the arms A^2 A^2 and the screws B. Meshing with the gear C′ are two other gears B′, B^2 which rotate in opposite directions, as will be readily understood from the drawings; they are carried by a central shaft D^2, which is provided with a split bearing in its center.

Upon each end of the shaft D^2 are pinions. marked respectively E, E′, each pinion meshing with a rack F, F′ and serving to drive the rack in either direction according to the direction of rotation of the shaft C.

Attached to each rack is a tool holder H set in ways H′ H′, and provided with the usual lost-motion gib H^2; each holder carries a tool H^3 set in the usual manner by bolts and so arranged that when fed it will tilt on its backward traverse, as is customary in machines of this class. It will be seen from this description that the rotation of the shaft C drives one of the tool-holders forward and at the same time brings the other one back to the beginning of its cut, so that the tools are always working and no time is lost during the return stroke; there is therefore no necessity for having a quick return or any increased complication in the feeding mechanism.

Passing through each tool-holding block H are feed-screws I I′, operated in the usual

manner by a star-and-ratchet gear J, striking against a fixed lug on the frame at the end of the tool stroke. The feed-screws I I′ have bearings upon the table H′, provided with ways and lost motion gibs G^2 G^2; the table being made in one piece with the racks F F′.

Referring to Fig. 2, the operation of the shifting bar will be apparent. Therein M′ is a lug or projection secured to the tool-carriage or table H′ and moving back and forth with it as it is driven by the rack and pinion; M is a bar passing through the bearings K′ K′, which it will be observed from Fig. 1 are duplicated upon the other side of the machine. M^2 M^2 are movable stops secured by set-screws to the bar M, with which the projection M′ engages as the tool-carriage nears the end of its stroke.

Referring also to Figs. 3 and 4, N′ is a shifting bar attached by the split collar N to the bar M, and communicating its motion to the bar R, which slides back and forth in bearings formed upon the frame which carries the pulleys P P′ P^2 and the back gears O O′. Q Q′ are shifting-forks for the usual crossed-belt arrangement by which the reversal of motion is obtained. Upon the bar R are formed cams R′ R^2 co-operating with tilting levers Q^2 Q^3 attached to the shifting forks Q Q′. The operation of this part of the apparatus is as follows: When the projection M′ engages, for instance, with the projection M^2, when going in the direction of the arrow, it forces along the bar M and by it the shifting bar N′, thus driving the bar R toward the left, moving the levers Q^2 Q^3 and the belt-shifting forks Q Q′; the pulley P is an idler-pulley, while the pulleys P′ P^2 are keyed to the shaft. Thus one of the belts, which run in opposite directions, is always upon the idler-pulley and as the belt-shifting forks are thrown to the left the uncrossed belt, for example, will operate the pulley P′ and the crossed belt will run on the idler-pulley, while when the shifting-forks are thrown to the right the crossed belt will be on the pulley P^2 and the straight belt on the idler-pulley. The forks are thrown to the right when the tool carriage passes to the right in Fig. 2 and its stop engages with stop M^2 on the shifting bar. The duplicate bearings K K upon the other side of the machine are provided so that when the frame is shifted to bring the tools where the lag screws B B bear in the drawings, thus shifting the screws ninety degrees in position, the bar M may be removed from the bearings K′ K′ and put into the bearings K K and will then operate in the same way, so that instead of having two reversing arrangements the same one may be employed.

I have found the arrangement described simple and efficacious; it may be readily put into place, is rapid in its operation and may be built for less than one-sixth the cost of a planing machine of ordinary style adapted to do the same amount of work, at the same time taking up very much less shop room.

Having thus described my invention, what I claim as new, and desire to protect by Letters Patent of the United States, is—

1. The combination of a frame, a shaft revolving therein arranged to rest in the bearings of a dynamo-electric machine, tool-carrying heads traversed thereby, and operating mechanism connecting the heads and shaft.

2. The combination of a frame adapted to fit within the frame of a dynamo-electric machine, means of centering such frame, a shaft revolving therein, tool-carrying heads traversed thereby, and operating mechanism connecting the heads and shaft.

3. The combination of a frame adapted to fit within the frame of a dynamo-electric machine, means of centering such frame, a shaft revolving therein arranged to rest in the bearings of the dynamo-electric machine, tool-carrying heads traversed thereby, and operating mechanism, consisting of suitable gears, racks and pinions connecting the shaft and the head.

4. The combination of a frame adapted to fit within the frame of a dynamo-electric machine, means of centering such, frame, a shaft revolving therein arranged to rest in the bearings of the dynamo-electric machine, tool-carrying heads traversed thereby, and operating mechanism, consisting of suitable gears, racks and pinions connecting the shaft and the heads and arranged to drive them in opposite direction.

5. The combination of a frame, a shaft revolving therein adapted to rest in the bearings of a dynamo-electric machine and driving a bevel gear, two other gears driven in opposite directions by such bevel-gear, racks and pinions operated by such gears, and tool-carrying heads, attached to such racks.

6. The combination of a frame, a shaft journaled therein and driving a bevel-gear, and two gears rotated in opposite directions, such bevel-gear each driving a pinion meshing with a rack carrying a tool-head; whereby the tool-heads are driven in opposite directions so that one tool cuts during the back-traverse of the other.

7. The combination of a frame, a shaft revolving therein adapted to rest in the bearings of a dynamo-electric machine, racks connected to such shaft by gearing adapted to move them in opposite directions, and tool-carrying heads arranged to have transverse motion upon suitable tables attached to the racks.

8. The combination of a frame adapted to fit within the frame of a dynamo-electric machine, a shaft revolving therein adapted to rest in the bearings of the machine, racks connected to such shaft by suitable gearing, tool-carrying heads arranged to have transverse motion on tables attached to the racks,

and feed-screws on such tables adapted to traverse the tool-carrying heads.

9. The combination of a frame adapted to fit within the frame of a dynamo-electric machine, a shaft revolving therein adapted to rest in the bearings of the machine, racks connected to the shaft by suitable gearing, tool-carrying heads traversed in one line by such racks and in another line by a feed-screw, a reversing bar carrying stops and a projection upon the tool-mechanism adapted to strike the stops and reverse the motion, substantially as described.

In witness whereof I have hereunto set my hand this 31st day of October, 1893.

HENRY B. HUGHES.

Witnesses:
WILLIAM S. BARGER,
H. S. ARENTZ.