

(No Model.)

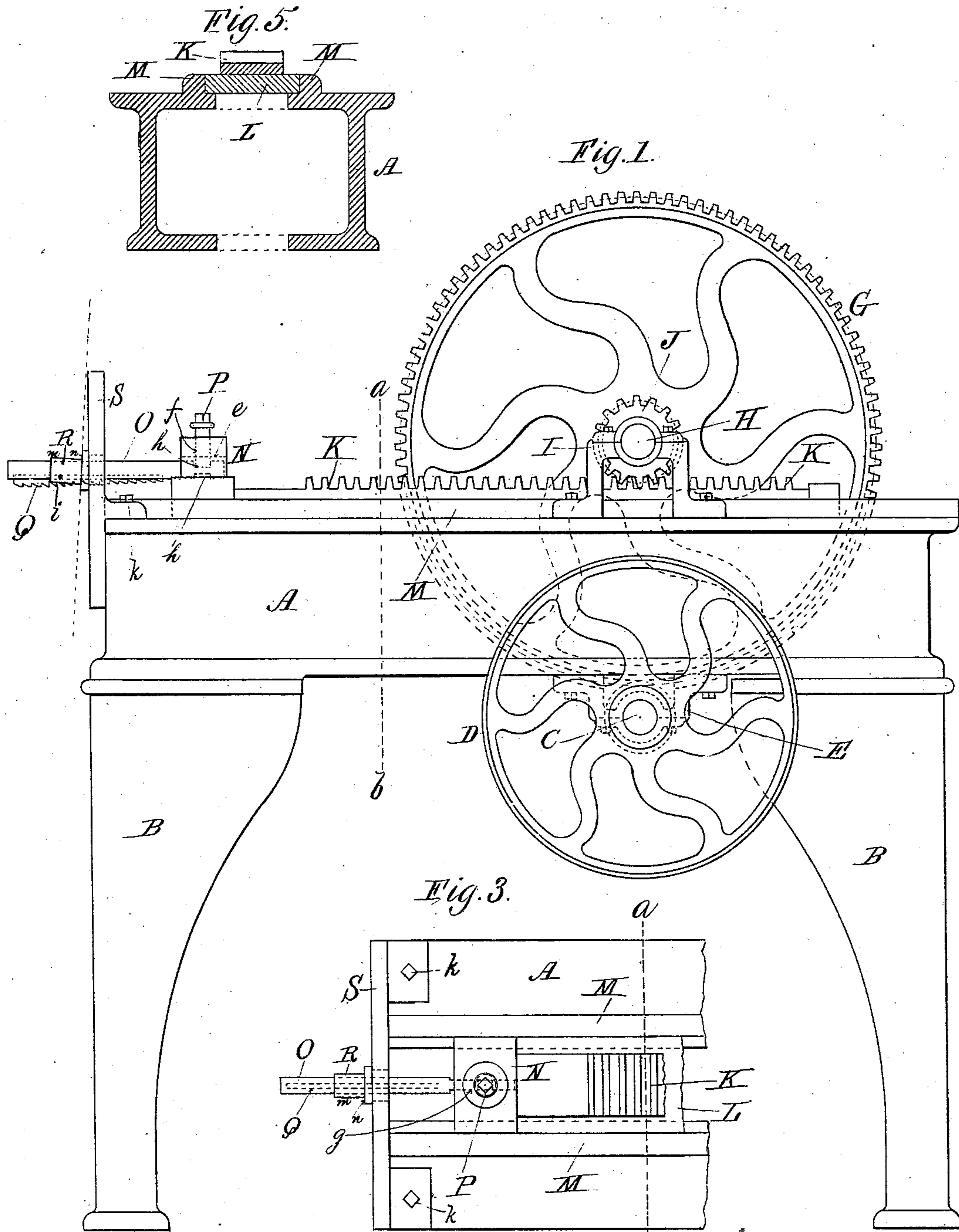
3 Sheets—Sheet 1.

L. J. KNOWLES.

MACHINE FOR FORMING KEY SEATS IN HUBS OF GEARS, &c.

No. 275,393.

Patented Apr. 10, 1883.



WITNESSES:

Henry B. Morrison
Albert A. Barker

Lucius J. Knowles [INVENTOR.]

(No Model.)

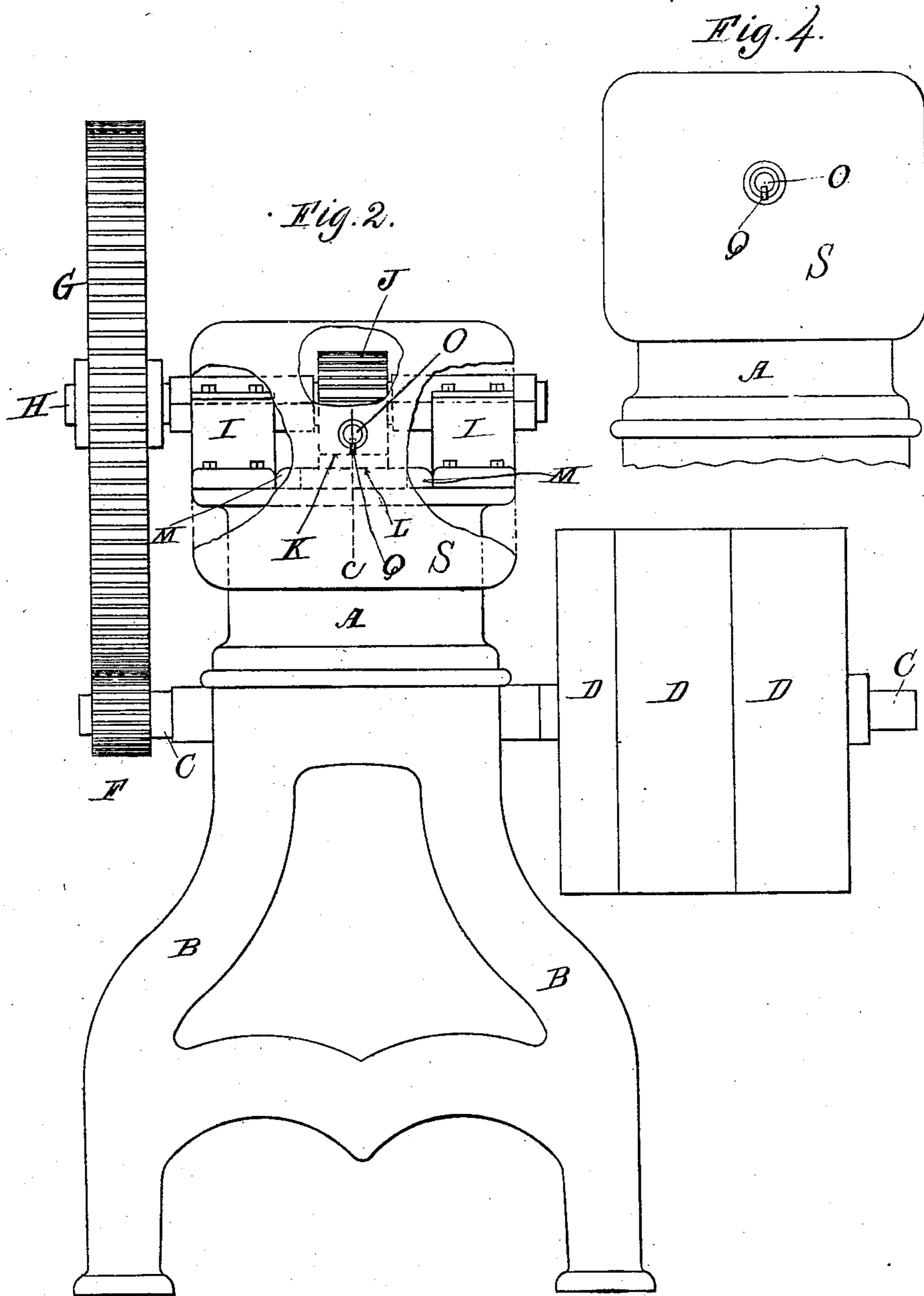
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WITNESSES:

Henry H. Brown
Albert A. Backer

L. J. Knowles

[INVENTOR.]

(No Model.)

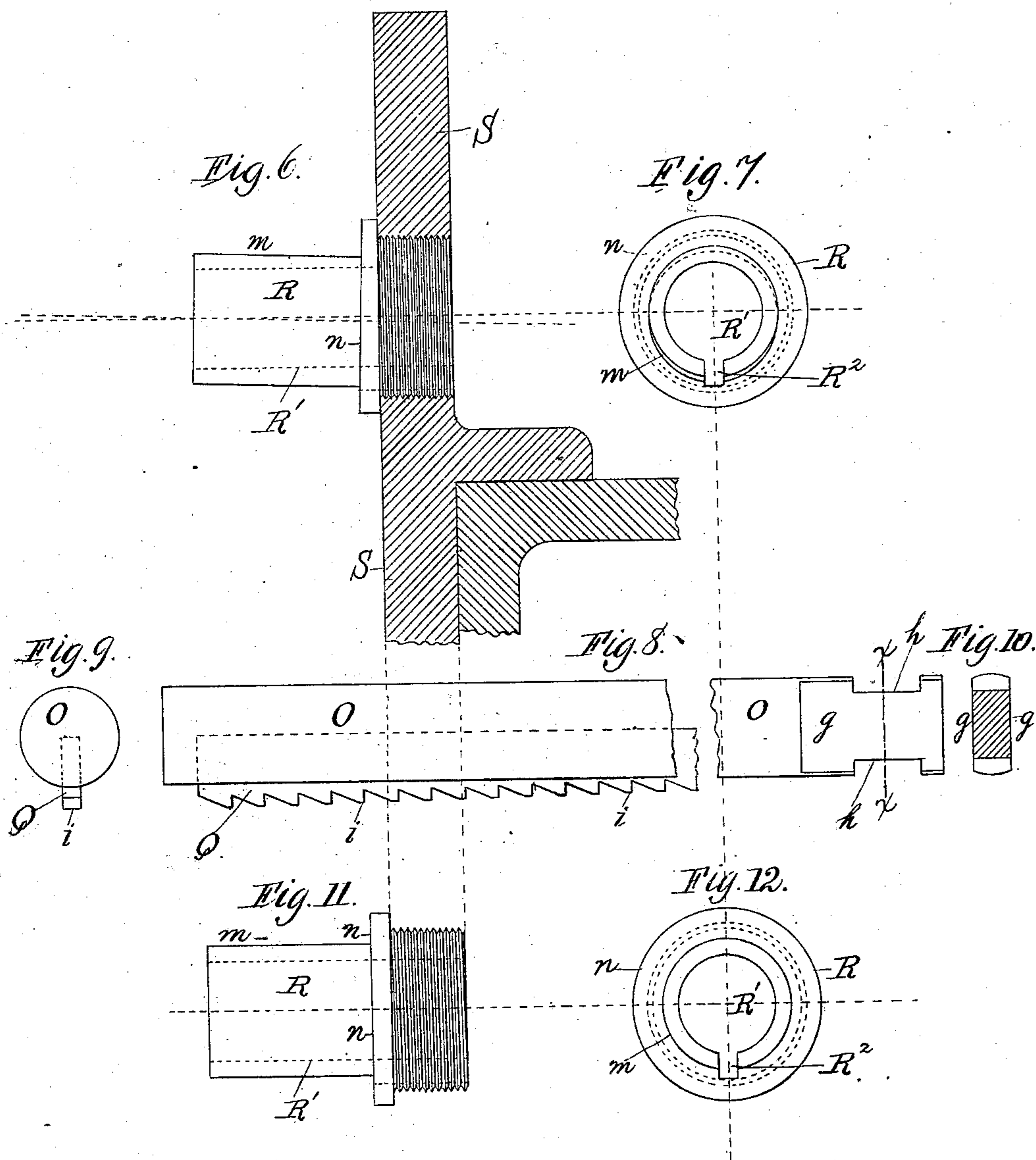
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WITNESSES:

Henry H. Munroe
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UNITED STATES PATENT OFFICE.

LUCIUS J. KNOWLES, OF WORCESTER, MASSACHUSETTS.

MACHINE FOR FORMING KEY-SEATS IN HUBS OF GEARS, &c.

SPECIFICATION forming part of Letters Patent No. 275,393, dated April 10, 1883.

Application filed April 4, 1882. (No model.)

To all whom it may concern:

Be it known that I, LUCIUS J. KNOWLES, of the city and county of Worcester, and Commonwealth of Massachusetts, have invented certain new and useful Improvements in Slotting-Machines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and in which—

Figure 1 represents a side view of my aforesaid improved slotting-machine. Fig. 2 represents a front end view of the machine shown in Fig. 1. Figs. 3 and 4 represent a top or plan view and a front end view, respectively, of a part of the machine, which will be hereinafter more fully explained. Fig. 5 represents a vertical transverse section through the machine, taken on lines *a b*, Figs. 1 and 3 of the drawings. Fig. 6 represents upon an enlarged scale a central vertical section taken at the point indicated by line *c*, Fig. 2 of the drawings; and Figs. 7, 8, 9, 10, 11, and 12 represent upon the same enlarged scale as Fig. 6 different details and modifications of parts of the machine, which will be hereinafter more fully described.

The nature of my invention relates to machines for cutting the key seats or slots in the hubs of gears, pulleys, or parts requiring similar slots cut in the same.

It consists in the combination of a horizontal arbor, provided with an inclined or tapering cutter, (which is operated longitudinally by suitable mechanism, hereinafter more fully described,) with a plate and stud which support the gear or other part to be operated upon.

It also consists in the combination, with the aforesaid supporting stud and plate and bed of the machine, of the horizontal arbor and its actuating mechanism, hereinafter described.

To enable those skilled in the art to which my invention belongs to make and use the same, I will proceed to describe it more in detail.

In the drawings, A represents the bed of the machine, which is supported upon suitable standards or legs, B. The main driving-shaft C, which is provided with the usual driving and loose pulleys, D, is fitted to turn in suit-

able bearings, E, secured to the under side of bed A. To the opposite end of driving-shaft C from pulleys D is secured a pinion, F, which engages with a large spur-gear, G, secured upon the outer end of a horizontal shaft, H, which is fitted to turn in suitable bearings, I, secured to the top of bed A. Centrally between said bearings I I, upon shaft H, is secured a pinion, J, which engages with a rack, K, and said rack K is formed upon or fastened to a carriage, L, which is fitted to slide forward and back in suitable ways, M M, when the machine is in operation. Said ways M may be either formed upon or fastened to the top of bed A. Upon the forward end of rack K is formed or secured a block, N, to which is fastened the inner end of arbor O, in the following manner, (see Figs. 1 and 3 of the drawings:) Said block N is provided with a longitudinal slot or opening (shown by dotted lines *e*) to receive the end of arbor O, and with a vertical threaded opening (shown by dotted lines *f*) to receive a holding-screw, P. The end of arbor O, which is inserted in longitudinal opening *e*, is cut away upon the sides, as represented by full and dotted lines *g*, so as to form flat bearing-surfaces to prevent said arbor from turning in said opening. It is held in block N by forming lateral slots in the top and bottom of the same, as represented by full and dotted lines *h*, and turning the holding-screw P down into the top slot, as is fully represented by dotted lines in Fig. 1 of the drawings, the bottom slot being filled by a projection formed on the block. Figs. 8 and 10 represent the construction of the inner end of the arbor, Fig. 10 being a cross-section taken on line *x x*, Fig. 8. The cutter Q, which is provided with sharp cutting saw-teeth *i*, is rigidly fastened to the under side of arbor O, as is represented in Figs. 1, 2, 3, and 8, with the bottom of said cutter converging downward slightly from its inner toward its outer end for the purpose of gradually cutting the slot in the part being operated upon deeper as said arbor is drawn back toward the machine by its actuating mechanism, hereinbefore described. The forward end of arbor O is supported and guided in its movement back and forth in a correspondingly-shaped opening, R', formed in a stud, R, secured to a vertically-

arranged plate, S, which is in turn secured at *k k* to the bed of the machine. Said stud R is provided with a longitudinal slot, R², to admit of the passage of the cutter Q back and forth. The part to be operated upon is slipped over the surface *m* of stud R against the shoulder *n* of said stud, where it is firmly held during the cutting operation by the cutter being drawn toward the machine, as before described.

Stud R may be constructed so as to project at right angles to plate S when fastened to said plate, as represented in Figs. 2, 3, 11, and 12, so that a straight longitudinal slot may be cut; or it may be made to project upon an angle to the plate eccentric to arbor O, as represented in Figs. 1, 6, and 7, so as to cut a slanting slot in the gear or other part to be operated upon. In either case the opening and slot formed in the stud would be concentric with arbor O.

The form and slant of stud R may be varied, as desired, for different kinds of work, and the slant of the cutter Q may also be made so as to cut the slot more or less rapidly.

It will be seen from the foregoing description that a very simple and practical machine may be produced. The several parts are few, as well as strong and durable, and actual

practice has demonstrated the fact that it will perform the work of from four to six men employing the old methods now in vogue. 30

Having described my improved slotting-machine, what I claim therein as new and of my invention, and desire to secure by Letters Patent, is—

1. The combination, in a slotting-machine, of a horizontal longitudinal arbor, O, provided with an inclined toothed cutter, Q, with a slotted stud, R, supported by the frame of the machine and adapted to support the gear or pulley to be slotted, substantially as and for the purpose set forth. 35 40

2. The combination, with rack K, block N, holding-screw P, and arbor O, provided with inclined toothed cutter Q, of stud R, plate S, and bed A, substantially as and for the purposes set forth. 45

3. The combination, with plate S and arbor O, provided with inclined or tapering toothed cutter Q, of the interchangeable studs R, substantially as shown and described.

LUCIUS J. KNOWLES.

Witnesses:

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