

(No Model.)

3 Sheets—Sheet 1.

A. C. ESTABROOK.

MACHINE FOR GRAVING BRUSH HANDLES.

No. 260,378.

Patented July 4, 1882.

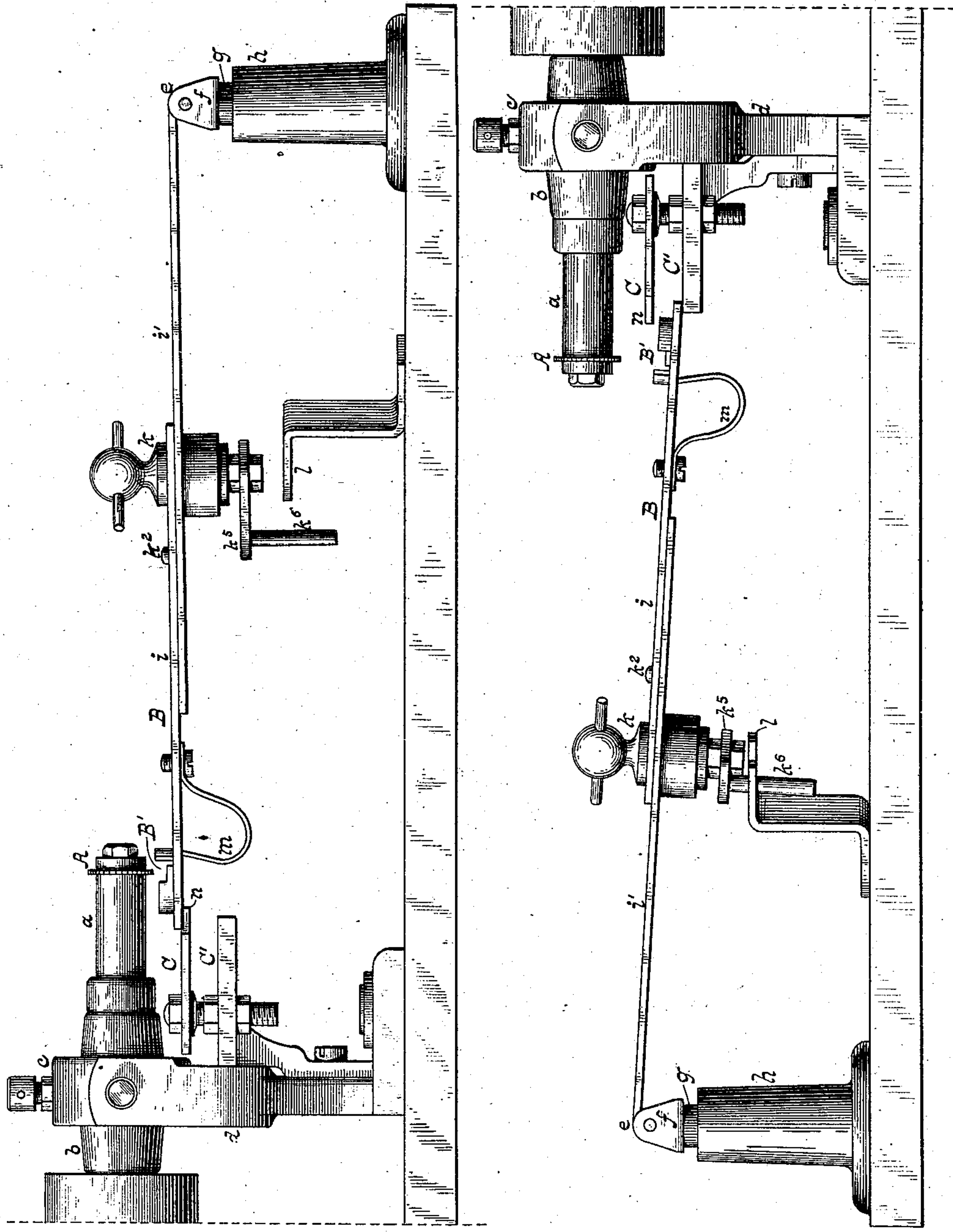


FIG. 1.

ATTEST:

Philip F. Larnet-
Novell Bartte.

INVENTOR:

Alexander C. Estabrook.
By Wm. C. Wood
attorney.

(No Model.)

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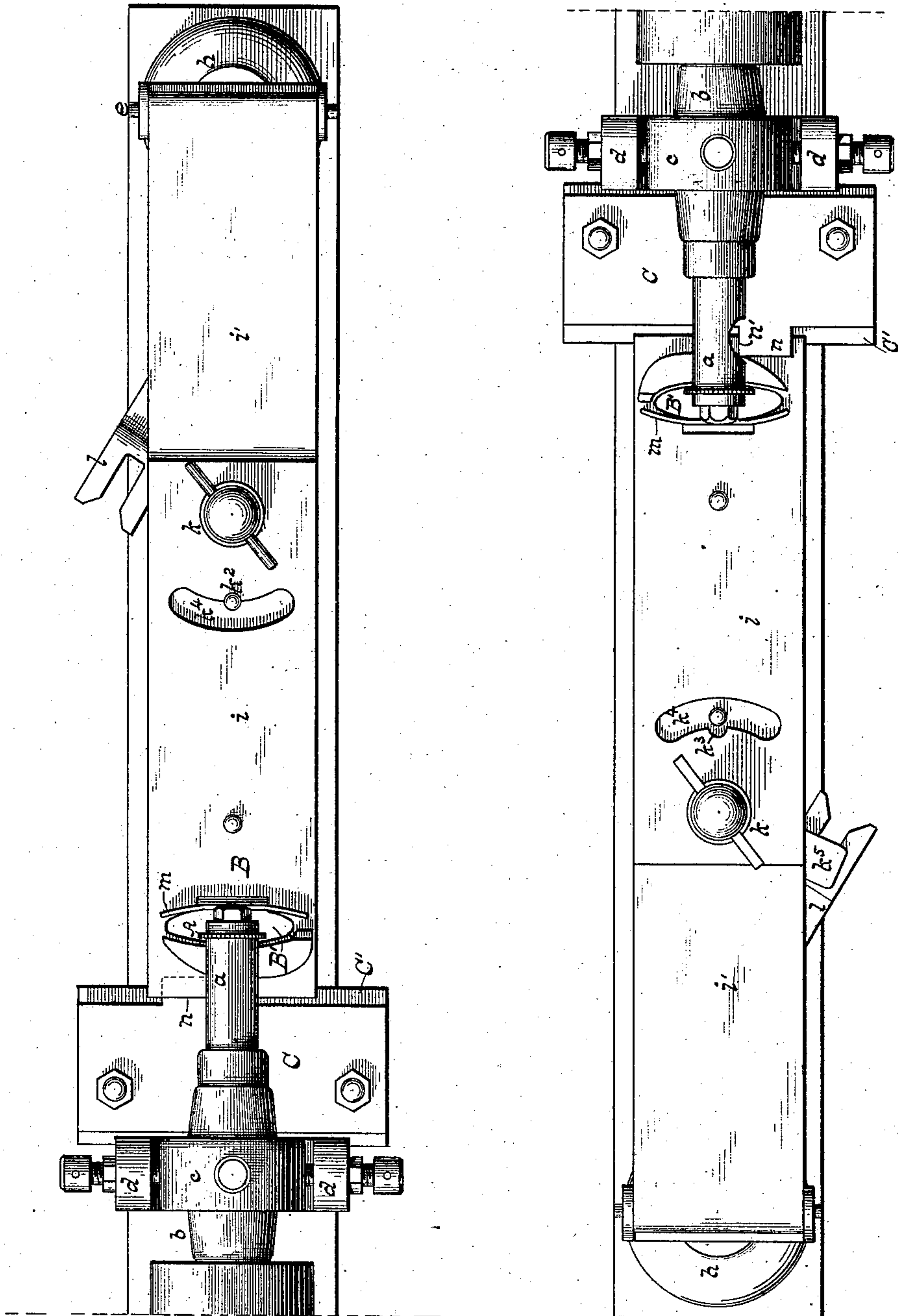


FIG. 2.

ATTEST:

Philip F. Larner.
Howell Larke.

INVENTOR:

Alanson C. Estabrook.
By *Amos M. Wood*
Attorney-

(No Model.)

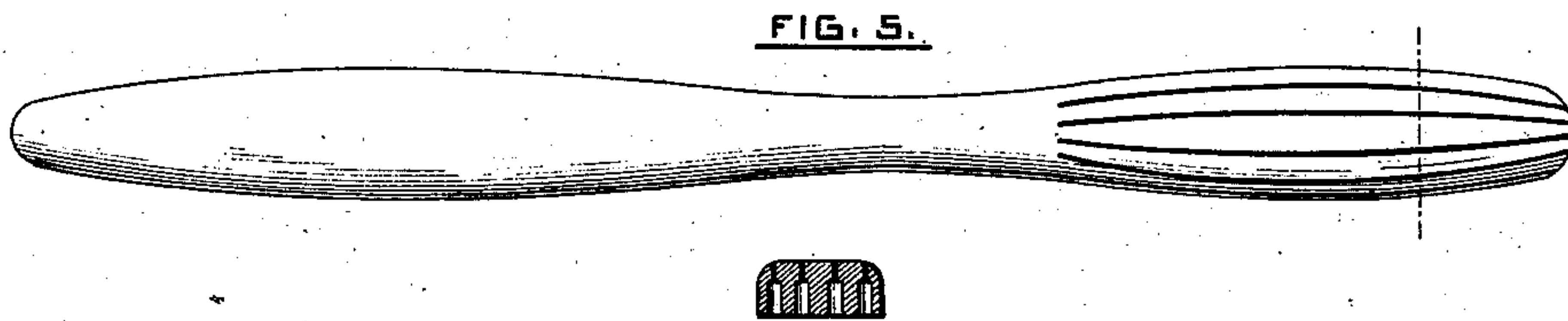
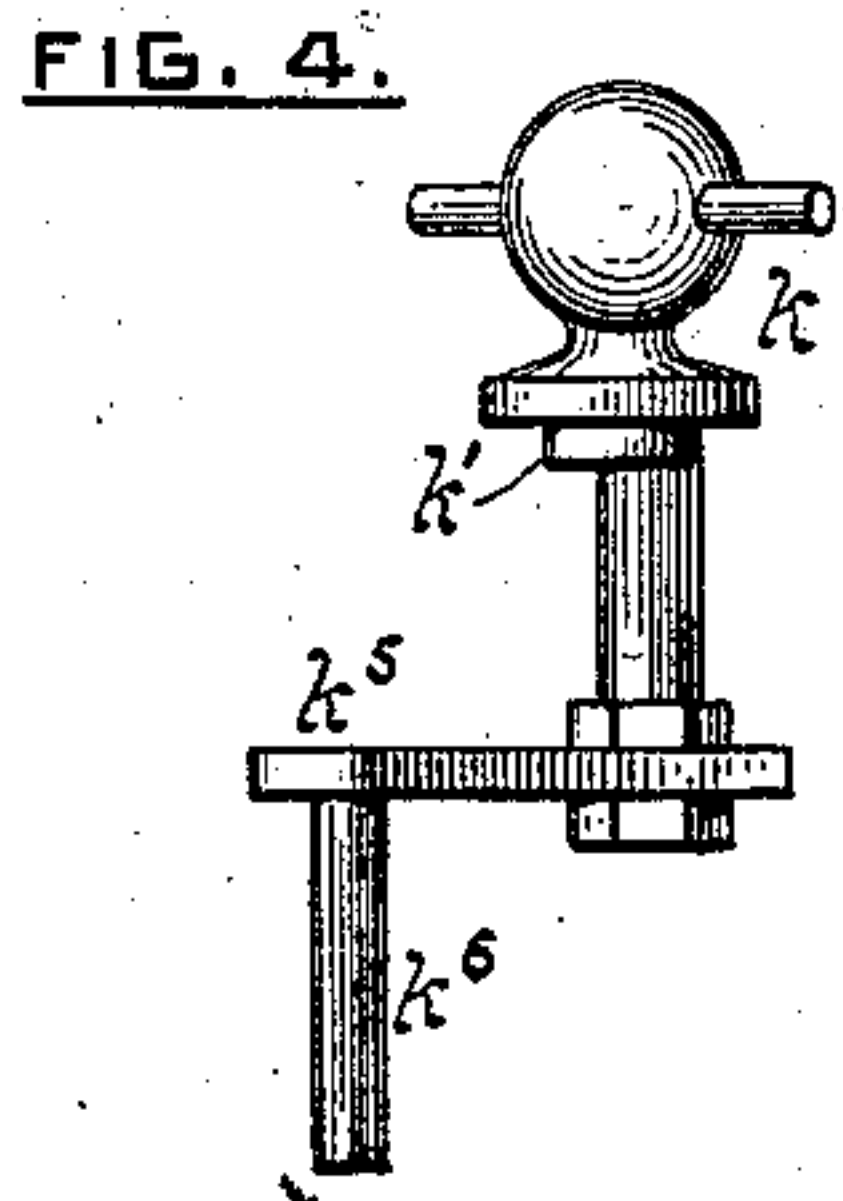
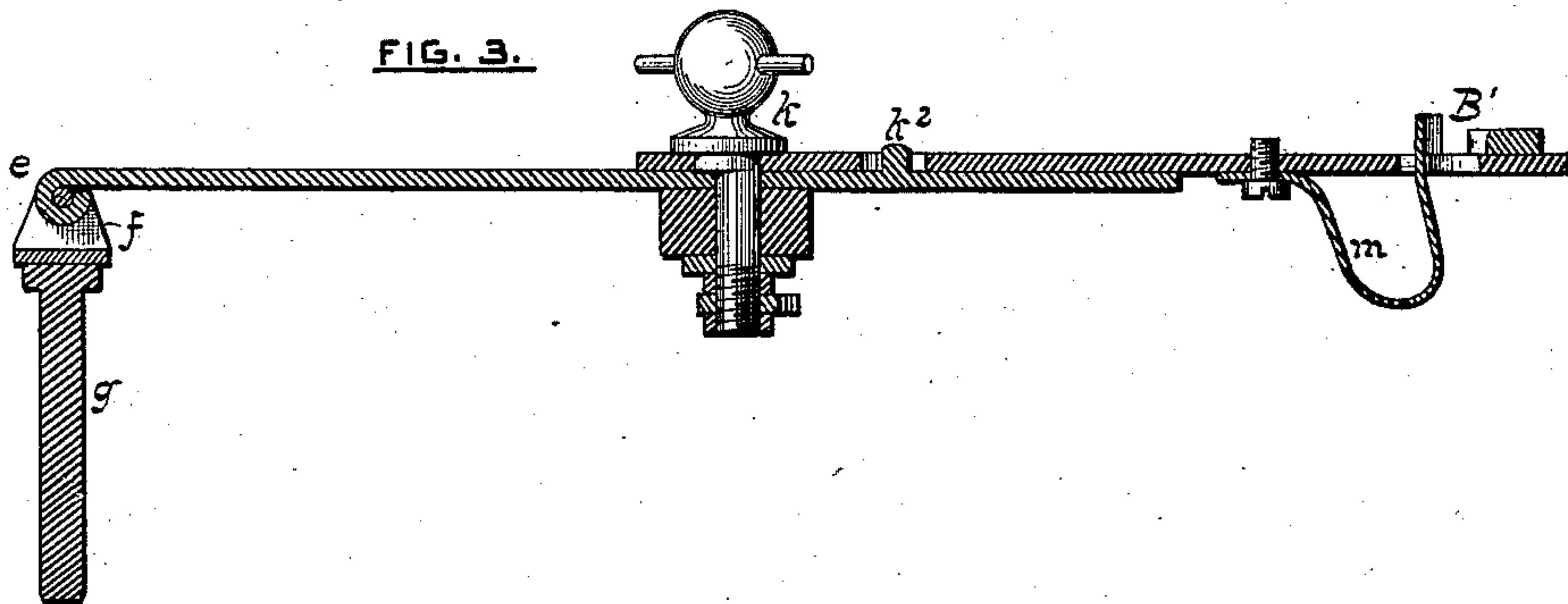
3 Sheets—Sheet 3.

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ATTEST:

Philip F. Larner
Howell Barth

INVENTOR:

Alanson C. Estabrook
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UNITED STATES PATENT OFFICE.

ALANSON C. ESTABROOK, OF FLORENCE, MASSACHUSETTS, ASSIGNOR TO
THE FLORENCE MANUFACTURING COMPANY, OF SAME PLACE.

MACHINE FOR GRAVING BRUSH-HANDLES.

SPECIFICATION forming part of Letters Patent No. 260,378, dated July 4, 1882.

Application filed January 17, 1882. (No model.)

To all whom it may concern:

Be it known that I, ALANSON C. ESTABROOK, of Florence, in the town of Northampton, county of Hampshire, and State of Massachusetts, have invented certain new and useful Improvements in Machines for Graving Brush-Handles; and I do hereby declare that the following specification, taken in connection with the drawings furnished and forming a part of the same, is a clear, true, and complete description of my invention.

Although machines embodying my several improvements are applicable in the manufacture of all substantially-straight brushes wherein the slots for receiving the bristle wires or twines occupy lines curved in the arc of a circle, I have specially devised them for slotting or graving tooth-brush handles wherein are four curved slots, two being in the arc of a smaller circle than the others; but machines embodying certain portions of my invention are applicable to straight-line graving. The graving of the tooth-brush handle is the last operation thereon prior to the insertion of the bristles, and if the graving be improperly performed it results in a loss of the material and the labor already expended. The tools heretofore employed for the purpose have been, so far as my knowledge extends, of such a character that only highly-skilled workmen could be depended upon for performing this operation, and even then the losses accruing from bad work were greater than those resulting from failures in all preceding operations. As heretofore practiced in all cases, so far as is known to me, the eye of the skilled workman has alone been relied upon for determining the location and curvature of the graving-lines, and this often resulted in a lack of desirable uniformity in their relations to each other and to the edges of the head, even although said lines were sufficiently well located with reference to the lines of bristle-holes to enable the bristles to be strongly secured by means of the wires usually employed for that purpose; but it frequently occurs that the slots and holes do not thus coincide.

The objects of my invention are to enable the operation of graving to be cheaply performed by persons of ordinary skill and intel-

ligence with greater accuracy and less liability of loss from imperfect graving than heretofore.

The heads of tooth-brush handles as heretofore made have lacked that uniformity of edge contour which would enable the edges thereof to be relied upon as gage-surfaces for determining the exactly-proper location of each graved line or each line of bristle-holes with which the graved lines should coincide as accurately as possible for mounting bristles in the best manner. In my machine the edge contour of the head is wholly relied upon as a gaging-surface, because the bone blanks from which any particular style of handle is developed are truly uniform in edge contour, especially at the head thereof, said blanks being produced by me in accordance with certain inventions heretofore made by me, and having outlines from which no material departure need be made in finishing the blanks into handles.

After fully describing a graving-machine as organized by me, in connection with such variations therein as may be made without materially affecting the results sought, the features deemed novel will be specified in the several claims hereunto annexed.

My machine embodies a graving-tool which is preferably a small circular saw specially adapted to the purpose, a clamp adapted to firmly hold the handles by edgewise contact therewith, and a bed for the clamp pivoted at one or at two points, whereby the clamp and a handle held thereby may be moved in a truly circular line or lines, and arranged at the end adjacent to the clamp to drop from beneath the graving-tool at the termination of each cut. As two of the four slots in each handle are curved in one direction and the other two in the opposite direction, a right and a left hand machine are requisite; but these may be so combined on one bed as to enable one saw-arbor to be employed for two saws, one at each end thereof.

Referring to the drawings, Figure 1 represents in side elevation a double machine embodying the several features of my invention. Fig. 2 is a plan view of the same. Fig. 3 is a longitudinal central section of the clamp-bed detached. Fig. 4 is a side view of a locking-bolt detached from the clamp-bed. Fig. 5 is

a top and sectional view of a bored handle as graved on my machine.

The graving-saws A are each substantially as heretofore; but I know of no prior machine for this purpose wherein two saws were mounted upon opposite ends of the same arbor, *a*. The arbor is provided with a band-pulley, and its boxes *b* are preferably pivotally mounted in collars *c*, which are in turn secured by adjustable pivotal connections to suitable standards, *d*. This is a common and desirable method of mounting rapidly-driven arbors, and although other simpler constructions may be employed, this is deemed preferable by me.

The clamp-bed may be variably constructed. If designed for cutting but one curved slot, it is provided with but one pivot or axis, located at a distance from the graving-tool equal to one-half the diameter of the circle of which the desired curved slot is an arc; but when two slots of different curvatures are to be cut by the use of the same clamp and bed the latter is composed of two parts, both of which are moved as one on one pivot in making the cut of the greater curve, and for describing the lesser curve the outer part only is used, that being independently pivoted to the inner part of the bed, which remains stationary upon its pivot.

The clamp-bed B, as here shown, is sectional, in that it is mainly composed of two plates of sheet-steel, and is laterally hinged at its rear end, as at *e*, to a yoke, *f*, provided with a vertical pivot or spindle, *g*, which is well fitted to a vertical hollow post, *h*, mounted on a bed-plate or bench. The center of the pivot *g* is located in exact line with the axis of the saw-arbor, and at such distance from the saw as will enable the outer end of the bed to move in the arc desired. The fitting of the pivot to its post and of the joint of the lateral hinge is such that the outer end of the bed is limited to horizontal and vertical movements.

The outer plate, *i*, of the bed is connected to the inner plate, *i'*, by means of a locking-bolt, *k*, of peculiar construction, which not only firmly unites the two plates when they, as a whole, are moved on the spindle *g*, but also serves as a pivotal connection as between said plates, when the bed is not moved on said spindle, and said bolt further locks the outer plate *i*, against any vertical movement independently of the inner plate, and, still further, it limits the inner plate to a vertical movement on its hinge, while the outer plate is free to swing laterally, and, finally, it accurately advances and retires the plate *i* longitudinally upon plate *i'* for properly spacing the two differently-curved slots as cut by the saw under the two conditions of adjustment. This locking-bolt *k* is shown detached in Fig. 4. Beneath its head its shank at *k'* is eccentric to its axis, and this portion thereof fully occupies a circular hole in the upper or outer plate, *i*, so that when said bolt is partially rotated in one direction the plate *i* is moved longitudinally upon plate *i'*, thus retiring the outer end

from the saw a distance exactly equal to the space between the curved slots, and when partially rotated in the opposite direction it advances the plate *i* so that its outer end will occupy such relations to the saw as will provide for cutting the slot of the larger curve, and when thus advanced a stud, *k²*, (projecting vertically from plate *i'*), occupies a recess, *k³*, in one side of the curved slot *k⁴* in plate *i*, thus locking the two plates against independent lateral movement, the broad bearing of the head of the bolt serving to prevent the lifting of plate *i* independently of plate *i'*.

At the lower end of the bolt is a horizontal arm, *k⁵*, having a pendent stud, *k⁶*, which moves in a circular path when the bolt is turned, and this co-operates with a standard, *l*, mounted on the bench or bed-plate, and having a horizontal top slotted from one end to receive the pendent stud when the bolt is so turned as to unlock the two plates, and it thus prevents the bed from turning laterally on its pivot *g*, while permitting it to freely rise and fall on its hinge, said stud moving vertically in the open slot. When the bolt is so turned as to lock the two plates together the crank-arm is swung forward, and the path described by it in moving with the bed on its main spindle or pivot lies outside of or beyond the slotted standard *l*. The top of bolt *k* may have a serrated periphery for readily grasping it; or it may, as shown, be provided with a diametrical finger-pin.

The outer end of the clamp-bed is provided with a clamp, whereby the head of the handle may be securely held in the exactly proper position with relation to the saw. This clamp may be variously constructed; but it must be arranged to engage edgewise with the head of a handle, and have the outer clamp-edge conform in contour with the edges of the heads to be graved, so that said edges may serve as gage-surfaces for assuredly locating the line of each slot, and said clamp should also at one end thereof be provided with a surface against which the front end of the head will engage for readily gaging the proper longitudinal position of the head within the clamp.

The clamp B', as here shown, embodies a strong bow-spring, *m*, of such form that one side of the clamp is integral therewith; but a clamp operated by a screw or by a cam-lever may be employed with good results. The spring-clamp shown is specially convenient as to putting in and taking handles therefrom, and it can be safely relied upon because of the uniformity in outline of the heads clamped therein, and the consequent uniformity of engaging contact; but although I prefer the spring-clamp I do not limit myself thereto, except as indicated in the claims hereunto annexed.

As will be seen in Fig. 5, the two outer slots are reversely curved in corresponding lines, and the two inner slots are similarly curved, although in arcs of a smaller circle than the outer slots, and each slot coincides longitudinally with the center of a correspondingly-

curved row of bristle-holes. It is desirable for the best results that each hole be centrally traversed at its inner end by the slot, and that said slots should be of uniform depth, and therefore I provide a bearing-plate for the outer end of the clamp-bed beneath the saw, which not only causes the head to be properly presented to the saw, but accurately gages the depth of the slots.

It will also be seen that each slot terminates at the neck of the handle, and therefore I provide such a bearing-plate as will permit the bed to drop when the end of the cut is reached, and to prevent the bed from dropping to the bed-plate or bench, and for affording a supporting-surface on which the bed may be drawn backward to the front, I provide a supplemental bearing-plate below the upper one. As arranged by me, these bearing-plates are mounted horizontally upon the front of an arbor-standard, *d*; but they may have a special standard. The bearing-plate *C* is above and parallel with the supplemental bearing-plate *C'*, and the plate *C* is mounted on screw-posts provided with set-nuts, whereby said plate may be adjustably set with reference to the saw, so that when the clamping-bed rests thereon, with a handle duly clamped, the saw will make a cut of the exact depth required, and this adjustment also provides for the compensation for wear of the saw by which its diameter is reduced. As here constructed, the bearing-plate *C*, as a whole, has considerable area; but only a small rectangular portion thereof, as at *n*, serves to actually support the clamping-bed, and the edge *n'* of said portion nearest the saw is so located that when the clamp-bed has been moved sufficiently to complete the cut it will drop from said edge to the supplemental bearing-plate upon which said bed is drawn backward and adjusted for making the second cut. If the outer slot be first cut, followed by cutting the inner slot, the bed is left at the latter adjustment for first cutting the inner slot on the next handle, followed by cutting the outer slot, and so on, using the bed alternately under its two adjustments. Having thus cut two of the slots with one saw, the other two stops are cut in another machine, or, if a double machine be employed, as shown, with the saw on the opposite end of the arbor.

I am well aware that several clamping-beds may be mounted on a horizontal revolving disk; but in that case neither bed need have the locking-bolt and separate outer plate, because two interchangeable disks of the required diameter would be necessarily employed if used in one machine, or a separate machine would be required for cutting each slot.

The pivoted clamp-bed and the saw may be relied upon for slotting without the bearing-plate; but this necessitates skill and care by the workman in graduating the depth of the cut, although the slots would be more accurately located and more properly curved than would be possible if the eye of the workman were alone relied upon, as heretofore.

The fact that I operate on handles which have heads precisely alike in their lateral dimensions, thickness, and contour, enables me to not only accurately execute curved-line grav-ing, as described, but it also enables me to employ certain features of my invention for slotting straight heads in straight and parallel lines with better and more uniform results than with slotting-saws for that purpose as heretofore constructed and operated. For instance, four or more parallel saws, properly spaced and mounted upon an arbor, have heretofore been employed by me with a bed-plate upon which the head of the handle rested while the head was advanced beneath the saws; but no gage-surfaces have been heretofore employed for guiding the head, because these latter have not been truly uniform, and this has necessitated great skill and care by the workman in properly locating by aid of his eye the outer saws with reference to the edges of the head; and if this be not accurately done the even and finished effect desired is not obtained, nor are the slots in accurate coincidence with the rows of bristle-holes. With such saws, my clamp, having a gage-surface, and my bed, having the same vertical movement, can be worked with absolutely uniform results, and without loss from bad grav-ing, even by inexperienced hands, it being only requisite that the clamp-bed instead of being pivoted as for curved grav-ing be mounted upon a sliding carriage limited to movements exactly parallel with the planes of the saws, and with such a clamp and bed the bearing-plate could be employed with results as satisfactory as with the pivoted bed, and with the clamping-bed thus mounted the bearing-plate can be profitably employed for causing the bed to drop at the proper moment for limiting the length of cut, thus placing the grav-ing operation practically within the capacity of unskilled labor and ordinary intelligence.

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

1. The combination, substantially as hereinbefore described, of the grav-ing-tool, a clamp provided with gaging-surfaces for engaging laterally with the head of a tooth-brush handle, and a clamp-bed limited in its horizontal movements to the line of grav-ing desired by mechanism substantially as described.

2. The combination, substantially as hereinbefore described, of the grav-ing-tool, a clamp for engaging laterally with the head of a handle, a clamp-bed limited by mechanism, substantially as described, in its horizontal movements to the line of cut desired, and a supporting-plate which maintains the clamp-bed in proper relations to the grav-ing-tool while cutting and permits the bed to drop at the termination of the cut.

3. The combination, substantially as hereinbefore described, of a suitable slotting or grav-ing tool for cutting wire-slots in tooth-brush handles, a clamp for engaging with the edges of the head of a handle, and a clamp-bed piv-

otally mounted at its rear end, whereby the head of a handle may be passed longitudinally beneath the graving-tool and slotted in a curved line on the back thereof, as set forth.

5 4. The combination, substantially as hereinbefore described, of the slotting-saw, the pivoted clamp-bed, its clamp, and the bearing-plate for maintaining the outer end of the bed and a brush-handle in the clamp at a proper
10 distance below the slotting-tool to insure a proper and uniform depth of cut, as set forth.

5. The combination, substantially as hereinbefore described, of the slotting-tool, clamp and clamp-bed, and a bearing-plate for one end
15 of the bed, which is vertically adjustable for varying the adjustment as to depth of cut and compensating for wear of the slotting-tool, as set forth.

6. The combination, substantially as hereinbefore described, of the slotting-tool, clamp,
20 the laterally and vertically pivoted clamp-bed, and the bearing-plate.

7. The combination, substantially as hereinbefore described, of the graving-tool, the clamp,
25 the horizontally and vertically pivoted clamp-bed constructed in sections independently pivoted to each other, and a lock for uniting said sections and permitting longitudinal adjustment of the outer section.

8. The combination, with the two clamp-bed
30 sections, of the eccentric locking-bolt for advancing or retiring the outer section of the bed, and pivoting said outer section or locking it to the inner section according to its required adjustment, substantially as described.

9. The combination, with the clamp-bed pivoted as to horizontal and vertical movements,
35 and constructed in longitudinal sections independently pivoted together, of a locking device, substantially as described, which limits
40 the inner of the bed-sections to its vertical movement, while the outer section is horizontally movable on its pivot, substantially as described.

10. The combination of the clamp-bed con-
45 structed in two sections pivoted together, and the locking-bolt operating as a pivot for the outer section and having an eccentric shank, and a crank-shaped arm co-operating with a
50 standard, with which said arm engages, for locking the inner section against horizontal movement while permitting the free vertical movement of the outer end of the bed, substantially as described.

ALANSON C. ESTABROOK.

Witnesses:

H. K. PARSONS,

ELEAZAR BRYANT.