

R. BISBEE.
Metallic-Brush Machine.
No. 227,952.
Patented May 25, 1880.

Fig. 1.

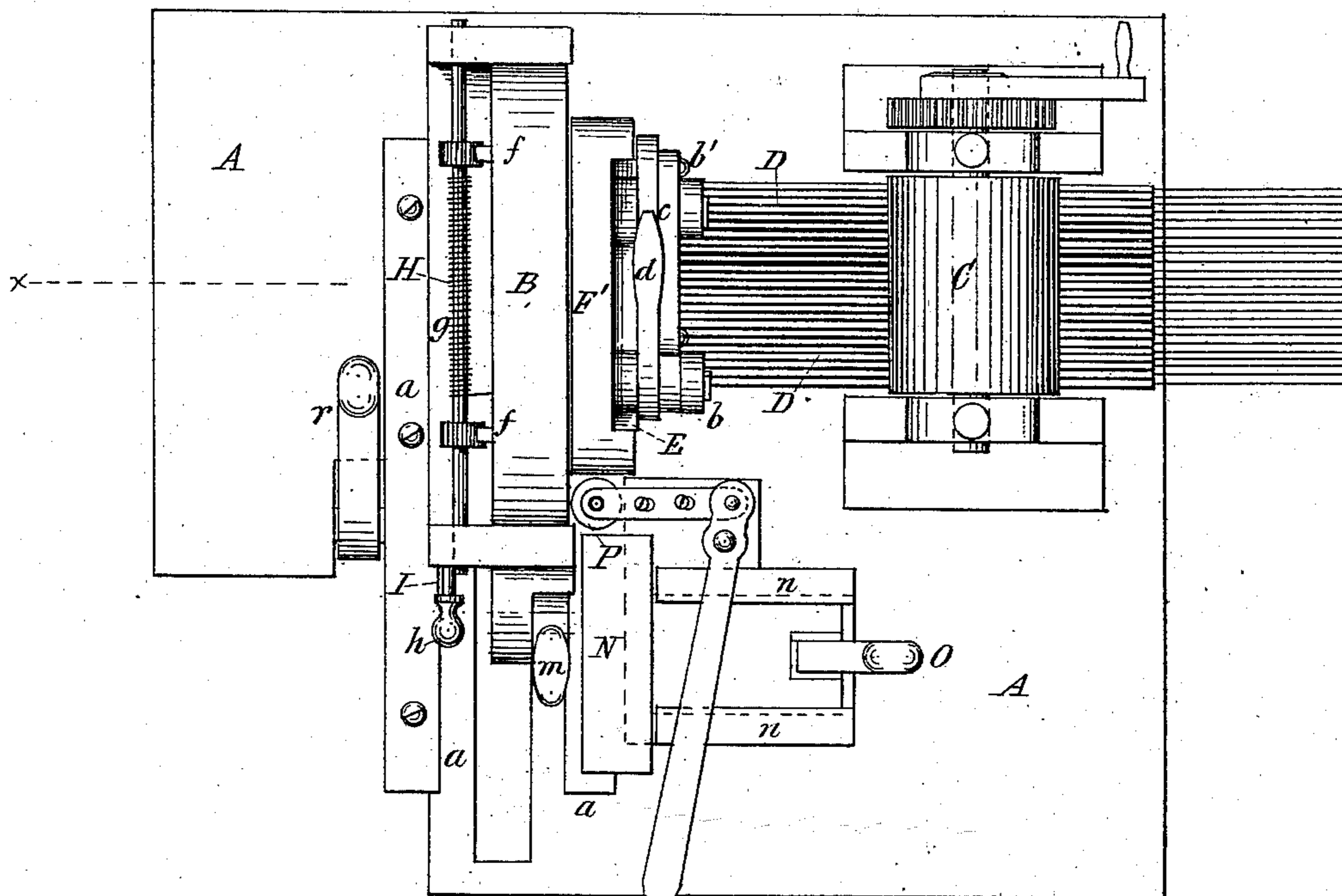
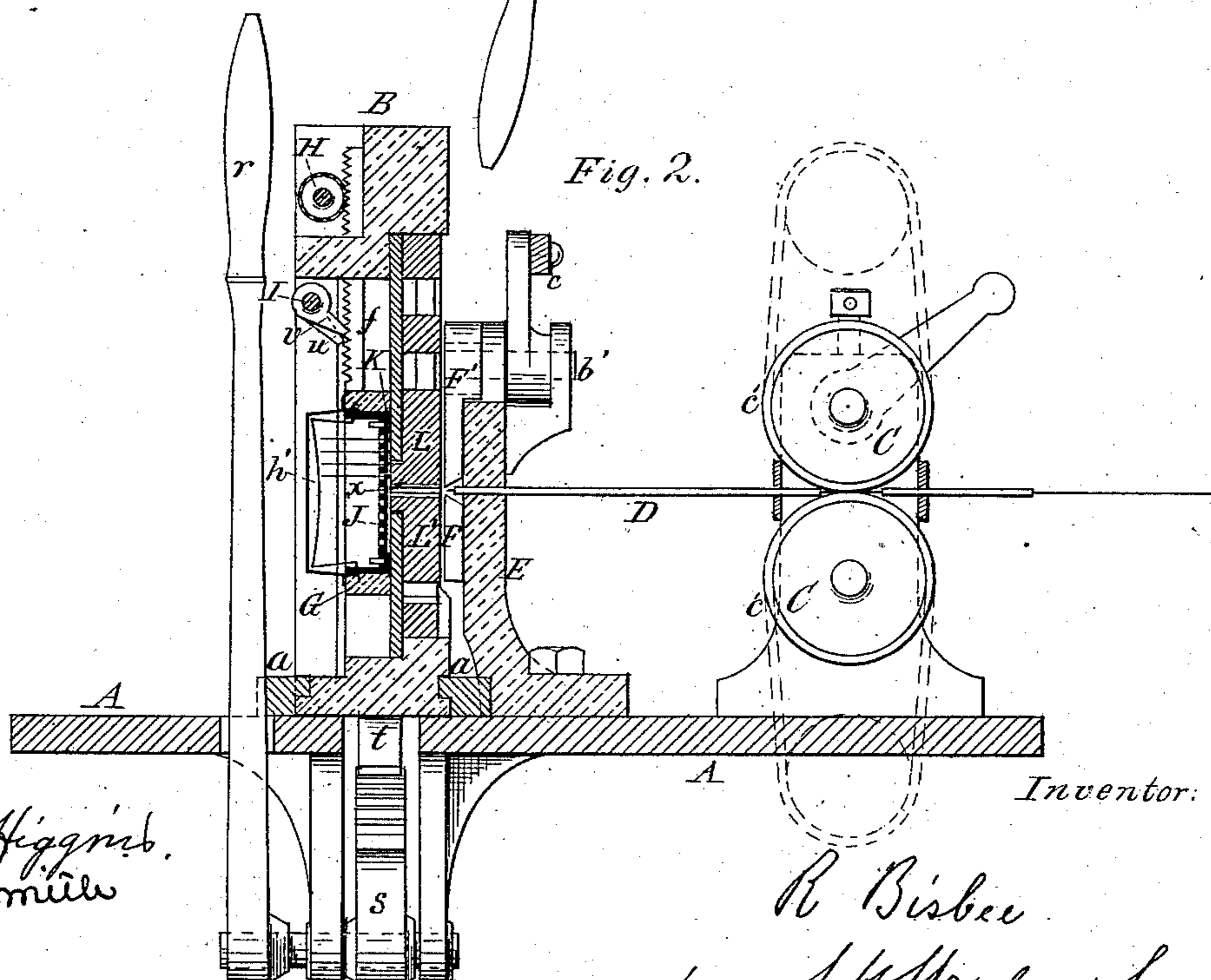


Fig. 2.



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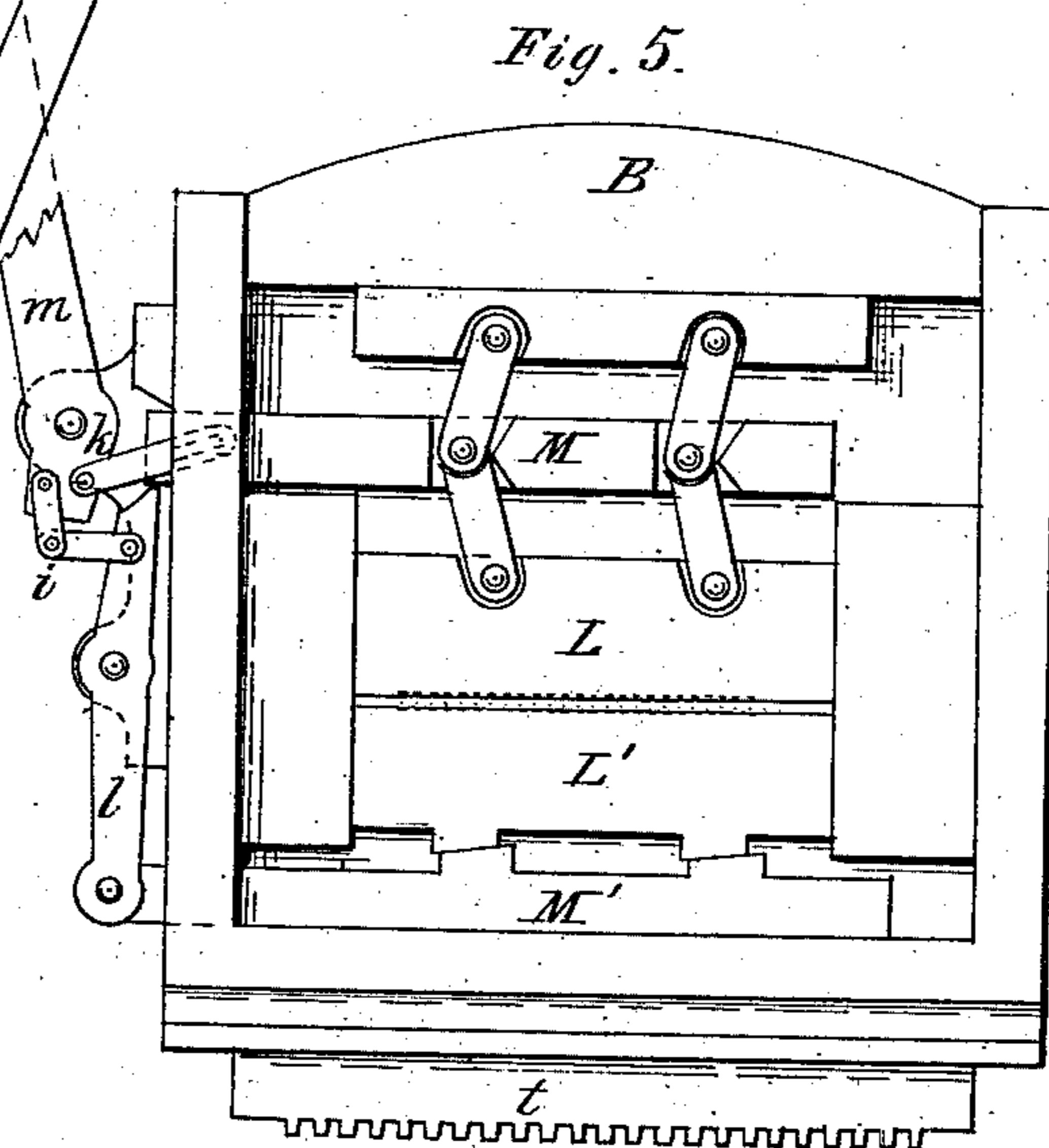
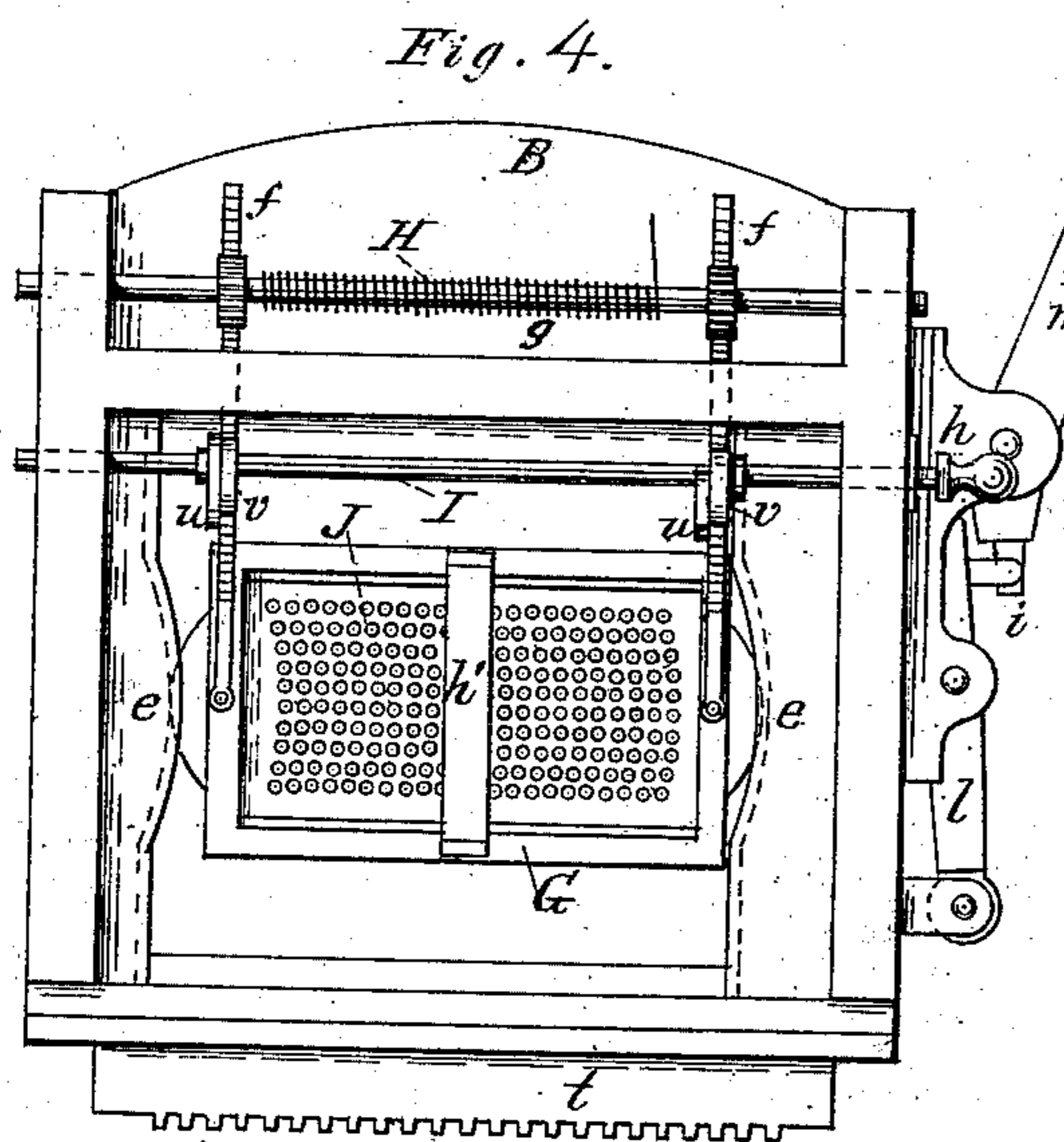
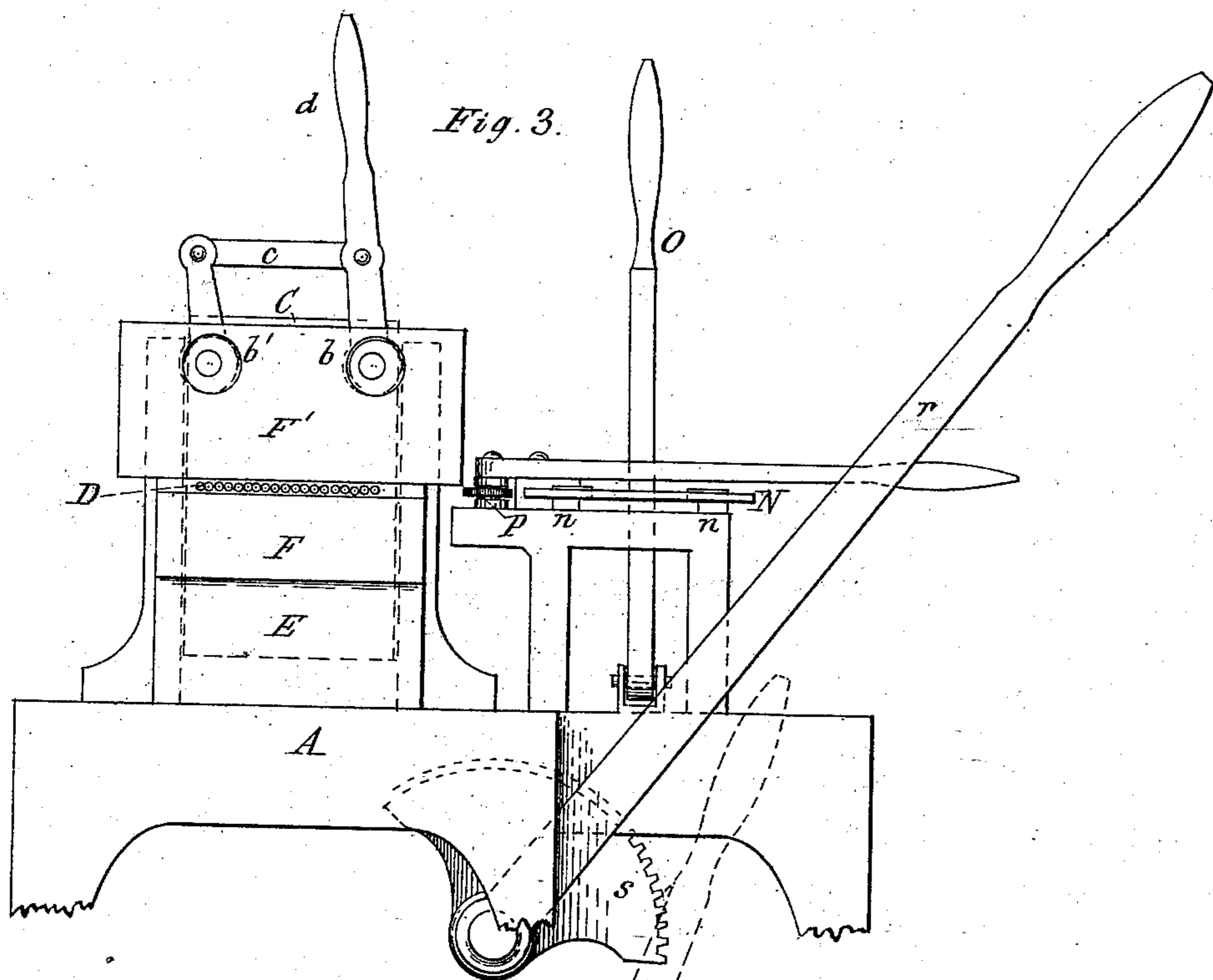
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2 Sheets—Sheet 2.

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UNITED STATES PATENT OFFICE.

RANDALL BISBEE, OF NEW YORK, N. Y.

METALLIC-BRUSH MACHINE.

SPECIFICATION forming part of Letters Patent No. 227,952, dated May 25, 1880.

Application filed January 28, 1880.

To all whom it may concern:

Be it known that I, RANDALL BISBEE, of New York city, have invented certain new and useful Improvements in Metallic-Brush-Making Machines, of which the following is a specification.

The main aim of my invention is to provide an improved machine which shall accomplish the insertion of the wire pins of the brush much more rapidly and perfectly than has been heretofore effected; and to impart a general introductory idea of the invention it may be here stated that the machine consists, mainly, of a traversing or reciprocating carrier, to which the brush-plate operated upon is clamped, in combination with wire-feeding rolls and wire-cutters arranged at one end of the carrier's traverse, respectively, to insert the wires in the brush-plate and cut off the inserted ends, and a wire-driver arranged at the opposite end of the carrier's traverse to drive home the inserted wires or pins.

The invention also embodies a number of additional novel features besides the general construction here outlined, which will be hereinafter fully set forth, and each distinct feature of novelty specified in the concluding clauses.

In the annexed drawings, Figure 1 presents a plan view of my improved machine. Fig. 2 is a longitudinal section on line *x* of Fig. 1. Fig. 3 is a front elevation with the carrier removed. Fig. 4 is a front elevation of the removed carrier, and Fig. 5 a rear elevation thereof.

The machine as shown in the drawings is designed for operation by hand, its various operating parts being provided with projecting hand-levers, as indicated, by which the several movements are effected. The machine may, of course, be also driven by power, and its several parts be accordingly connected by suitable automatic mechanism, to render all the operations of the machine continuously automatic, from the insertion of the brush-blank to the completion of the brush.

The base or table of the machine is indicated by A, at one end of which is the traversing carrier B, which sustains the brush, operated upon in suitable guides or ways *a a*, so as to be capable of a free reciprocating or traversing movement from one side of the table to the other.

C C are the wire-feeding rolls, which are arranged at one side of the table and at one end of the carrier's traverse. The rollers are supplied with a whole series of continuous lengths of wires, as indicated, and are adapted to insert the whole series of wires directly in the pin-sheet of the brush (usually formed of one or more plates of sheet-rubber) by a single simultaneous action, so as to form a complete row of pins in the brush at once, the pins being cut, after insertion, from the continuous lengths of wires. The rollers are suitably geared together, and are provided with a ratchet-feed operated by a convenient hand-lever or other suitable means, by which uniform intermittent impulses may be given to the rollers to insert the proper length of wire at each action. The wires are guided to and from the gripe of the rollers by tubular guides D D, in which the wires snugly fit, and which prevent any possible bending or deflection of the wires in the act of their insertion. These guides terminate at the front surface of an upright abutment, E, which is arranged close to the rear surface of the carrier B, the orifice of the guides opening just over the edge of a fixed cutter, F, and under the edge of a movable cutter, F', which are sustained on the abutment E, the movable cutter F' being depressed against the fixed cutter F to effect the severance of the pins after insertion by means of powerful eccentric or cam rock-shafts *b b'*, which are coupled together by a link, *c*, and actuated by a projecting hand-lever, *d*.

The rear face of the carrier is arranged in direct proximity to the cutters and to the orifice of the wire-guides, so as to receive the feed of the wires at their immediate exit, so that the wires pass directly through the carrier into the brush, which is clamped on the opposite side of the carriers in a holder or clamp. This holder is shown at G, Figs. 2 and 4, and consists of a frame in which the brush is held, and which is arranged to have an intermittent vertical feed on the front face of the carrier, so as to shift the brush a sufficient space after each action of the roller to receive successive rows of pins. This frame G moves between vertical guides *e e*, one of which is convex and the other concave, so as to impart a lateral curved direction to the movement of the holder, so that the ends of

the collective rows of pins in the finished brush shall have respectively a convex and concave termination corresponding to the guides, so as to give a rounded shape to the ends of the brush.

The feed device consists of toothed racks *ff*, which rise from each side of the holder-frame *G*, and which gear at the top with a pinion-shaft, *H*, on which a spring, *g*, is coiled, and which tends to constantly raise the racks, and with them the brush-holder *G* and brush. The movement of the holder is, however, controlled by the feed-operating bar *I*, which extends horizontally across the carrier and is fitted with an operating-knob, *h*. This bar is provided at each end with a pair of compound pawls, *uv*, which engage with the racks *ff*, one of the pawls of each pair being fixed and the other movable, and the two separated laterally and vertically the space of one tooth, the play of the movable pawl being equal to one tooth of the rack, so that a back-and-forth movement of the operating-bar, which is properly limited by stops, permits the racks to escape or move one tooth, or a sufficient distance to make the proper feed to form the different rows of pins in the brush, when they remain fixed till the next movement.

The brush-clamp proper consists, as shown in Figs. 2 and 4, of an external plate, *J*, which is perforated by rows of holes corresponding to the rows of pins of the brush, and an inner marginal rim, *K*, between which the rubber plate *x*, forming the pin-sheet or brush-blank, is held, and the whole snugly socketed in the holding feed-frame *G* and clamped close to the face of the carrier *B* by a spring-catch, *h'*, or other suitable fastening.

An aperture extends through the carrier just on a line with the feed of the wires, in which clamping-jaws or grippers *L L'* are fitted, and which extend in one direction close to the brush-plate and in the other close to the edge of the cutter and to the orifice of the wire-guides *D*, the meeting faces of the jaws being grooved to form holes or passages to permit the passage of the wires into the brush, the mouths of which are flared to insure the accurate entrance of the wires, while the jaws or grippers are tightly closed or opened by the action of toggles or wedges *M M'*, Fig. 5, arranged on each side of the jaws on the rear of the carrier, and connected by the links *ik* and lever *l* with the operating hand-lever *m*, and by which a powerful gripe is obtained upon the wires after they have been inserted in the brush and severed by the cutters.

On the side of the table opposite to the rollers, and at the other end of the carrier's traverse, is arranged the driver *N*, which drives the wires home after their insertion and severance, and which is arranged just on a level with the wire-feed and with the opening of the clamping-jaws *L L'*. This driver consists of a flat straight plate of a thickness a little greater than the wires, and which is fitted to

slide in guides *nn*, and adapted to be forced toward the carrier by a hand-lever, *O*.

Between the wire-cutters *F F'* and driver *N* a knurl or milling-roller or riveting-tool, *P*, is arranged, closely approaching the carrier and on the same line with the driver, and in line with the ends of the row of inserted wires held in the jaws of the grippers, being mounted on a sliding bar operated by a hand-lever, as shown in Figs. 1 and 3.

The carrier *B* is traversed from side to side of the table, to receive alternately the action of the feed-roller *C* or driver *N*, by the hand-lever *r*, which projects from the axis of a toothed quadrant, *s*, arranged beneath the table, and which meshes with a rack, *t*, formed on the base of the carrier between the guiding-ways *aa*.

The operation is as follows: The brush-plate being properly clamped in the holder and placed in proper position to receive the wires, and the grippers *L* and cutters *F* being open to permit the passage of the wires, the carrier is moved to its correct position in front of the rolls. The rolls are then moved a partial rotation, and the ends of the row of wires thus forced into the brush-plate, the ends being projected through from the opposite side. The grippers are then closed on the wires to hold them firmly, and the cutters are moved, which severs the wires close to the gripping-jaws, thus leaving the ends of the wires inserted in the brush and held by the grippers. The carrier is then shifted to the opposite side of the table, the milling-roller *P* being projected at the same time forward, so that in the movement of the carrier the ends of the row of wires which protrude slightly from the gripper-jaws receive the pressure of the roller or knurl, and thus become swaged or riveted thereby, so as to form heads on the ends of the inserted wires or pins, which prevent their being drawn out of the brush. To effect this heading the carrier is given a forward and back movement under the pressure of the heading-tool, which back-and-forth movement may be repeated more or less, as required. When the heading is thus effected the carrier is stopped in front of the driver, the clamping-jaws are opened, and the driver is forced forward against the heads of the pins and between the jaws of the gripper, and the pins thus driven fully home, their heads being forced tight against the rubber pin-plate of the brush. The driver is then withdrawn, and the feed operated to shift the brush-holder a sufficient space to receive another row of pins, when the carrier is again shifted in front of the rollers, and the same operation repeated till all the rows of pins are inserted and the brush completed, when it is removed from the holder and another blank inserted, and the operation continued.

The feed-rolls *C* are preferably faced with vulcanized rubber or similar elastic frictional material, as indicated at *c'*, the gripping-surface being preferably without grooves, and adapted

to grasp the wires by embedment therein, as this is found, practically, to give a more powerful gripe and a better result generally, as it does not injure the surface of the wire in the least, which would be the case with a metallic gripping-surface. This construction forms one feature of the invention which is of great importance where the wires are driven directly into the brush.

10 Instead of having the rubber gripping-surfaces fixed permanently on the periphery of the rollers, they may be formed in the shape of endless bands of rubber passed over the driving-rolls C, extended therefrom, and returned over idle-rollers above and below the driving-rollers, as indicated by dotted lines in Fig. 2.

In order to counteract the thrust of the cutters in severing the wires, which tends to force the carrier away from the cutters, and is liable sometimes to mutilate or bend the ends of the wires, I propose to lock the carrier to the abutment E at the period of cutting by means of the movement of the cutting-lever engaging with a locking-cam on the carrier, which will thus draw or tighten the carrier toward the cutters in opposition to the thrust of the cutters.

It will be observed that in my improved machine the wires are driven directly into the brush-plate, and a complete row at one action, without any previous punching, which has been heretofore thought essential. By this means of direct action not only is the mechanism of the machine rendered more simple and its operation more rapid, but the work is, in addition, much more accurate and durable, for when the pin-sheet is previously punched, it is found that the wires have often a tendency to become misdirected in passing through the sheet, and, moreover, when inserted, are held with less firmness and are more liable to become torn out by the action of use.

The features which I claim as new and constituting my invention are as follows:

1. A metallic-brush machine composed of a traversing carrier, B, to which the brush-head is clamped, in combination with wire-feeding rolls C and wire-cutters F F', arranged at one end of the carrier's traverse, to insert the wires and sever the ends thereof, and a driver, N, arranged at the opposite end of the traverse, to drive home the inserted wires, substantially as set forth.

2. In a metallic-brush machine, feeding-rollers C, adapted to insert at a single action a complete series or row of pins, in combination with a brush holder or carrier, B, arranged to present the whole length of the brush to the action of the rolls to receive the successive insertion of complete rows of pins.

3. In a metallic-brush machine, the combination of wire-feed rolls C, arranged to drive the wires directly into the brush-plate, and of cutters F F', arranged to sever the wires after insertion, in combination with a brush holder

or carrier, B, arranged in direct proximity to the exit of the wires from between the cutters.

4. The combination, in a metallic-brush machine, of wire-feeding rollers C, wire-cutters F, and a brush-holder arranged to present the brush to the inserting action of the rollers, with the tubular wire-guides D, extending from the gripe of the rollers to the edge of the cutters.

5. In a metallic-brush machine, a brush-holder, G, adapted to hold and present the brush to receive the insertion of the wires and to be shifted or fed successively to receive successive rows of wires, in combination with guides *e e*, by which the feeding movement of the holder is guided, which are curved laterally to the line of feed to give a rounded termination to the collected rows of pins in the brush.

6. In a metallic-brush machine, a brush-clamp formed of an inner marginal rim, K, and an external perforated plate, J, between which the pin-sheet of the brush is held, and by which it is clamped against the machine to receive the inserting action thereof, substantially as shown and described.

7. In a metallic-brush machine organized to insert at one action a row or series of wires, the wire-heading tool P, arranged in the path of the motion of the brush-carrier B, and in line with the inserted row of wires, to rivet the heads of the inserted wires by the traversing movement of the carrier and the pressure of the tool against the same, substantially as set forth.

8. In a metallic-brush machine, the combination, with the feeding brush-holder G, of the tooth-racks *f f*, spring-impelled shaft H, carrying pinions, and feed-bar I, with its engaging-pawls *u v*, arranged and operating substantially as shown and described.

9. In a metallic-brush machine provided with a brush carrier and holder adapted to hold and present the brush to the action of the machine, and with feeding-rolls C, or equivalent, to insert the wires in the brush, and cutters F F', to sever the wires after insertion, grippers L L', arranged close to the edge of the cutters and to the plate of the brush, to firmly gripe the ends of the wires after severance, to enable the effective riveting or heading of the ends thereof.

10. In a metallic-brush machine, wire-feeding rolls C, adapted for the insertion of wires, having their gripping-surface formed of rubber or equivalent elastic frictional material adapted to grasp the wires by embedment therein without injury to the wires, in combination with a brush holder or carrier arranged to receive the insertion of the wires from the rolls, substantially as herein shown and described.

RANDALL BISBEE.

Witnesses:

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