(No Model.)

3 Sheets—Sheet 1.

C. REHSE.

BRUSH MAKING MACHINE.

No. 545,910. Patented Sept. 10, 1895.

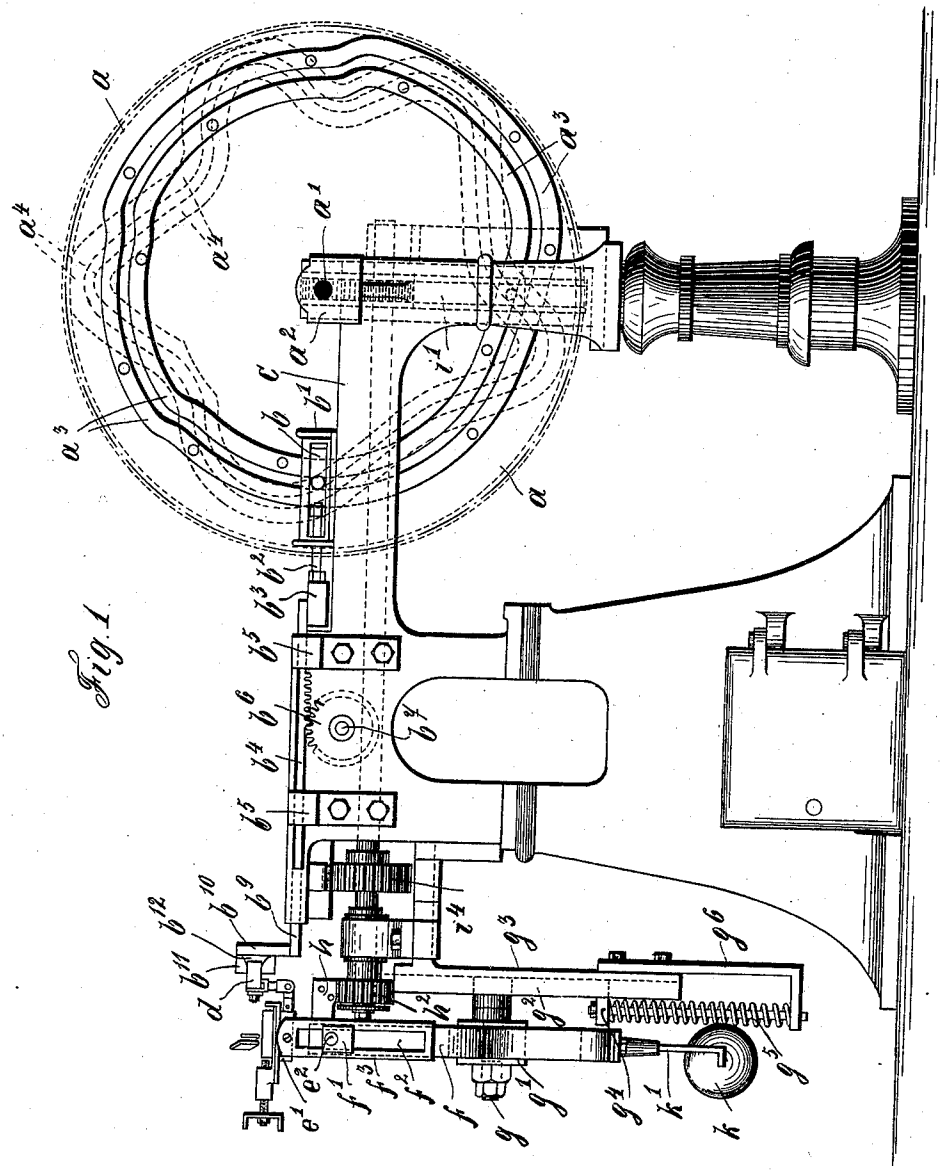

Fig. 1.

Witnesses:
Arthur Walther
Emil Kayser

Inventor:
Carl Rehse
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Attorney

(No Model.)

3 Sheets—Sheet 2.

C. REHSE.

BRUSH MAKING MACHINE.

No. 545,910. Patented Sept. 10, 1895.

Fig. 2.

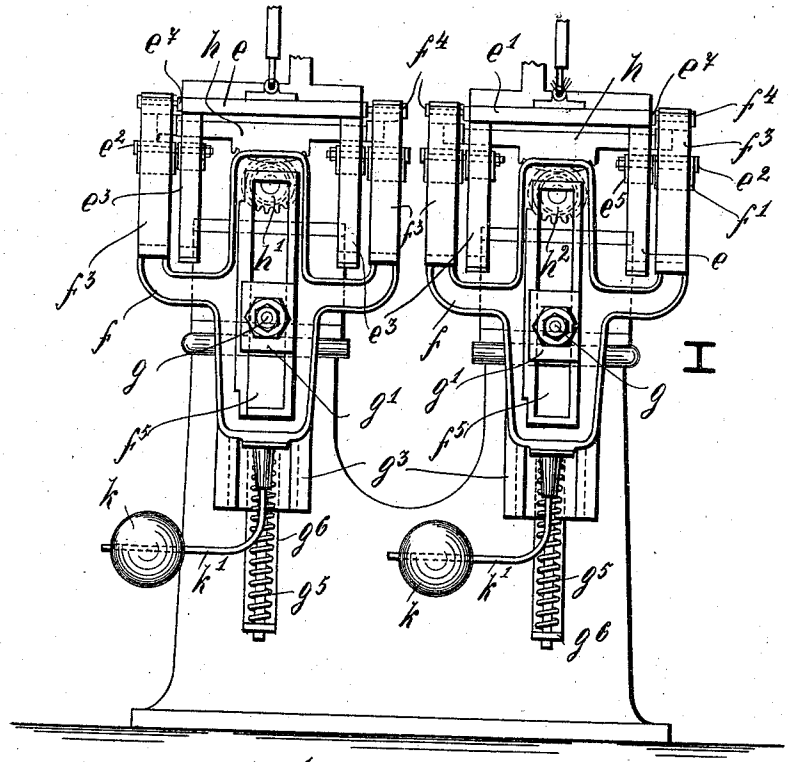

Fig. 5.

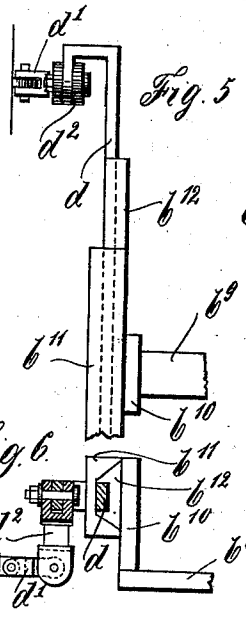

Fig. 7.

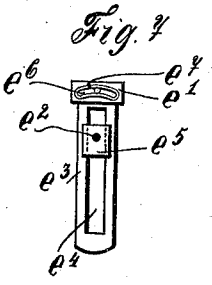

Fig. 6.

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(No Model.) 3 Sheets—Sheet 3.

C. REHSE.

BRUSH MAKING MACHINE.

No. 545,910. Patented Sept. 10, 1895.

Fig. 4

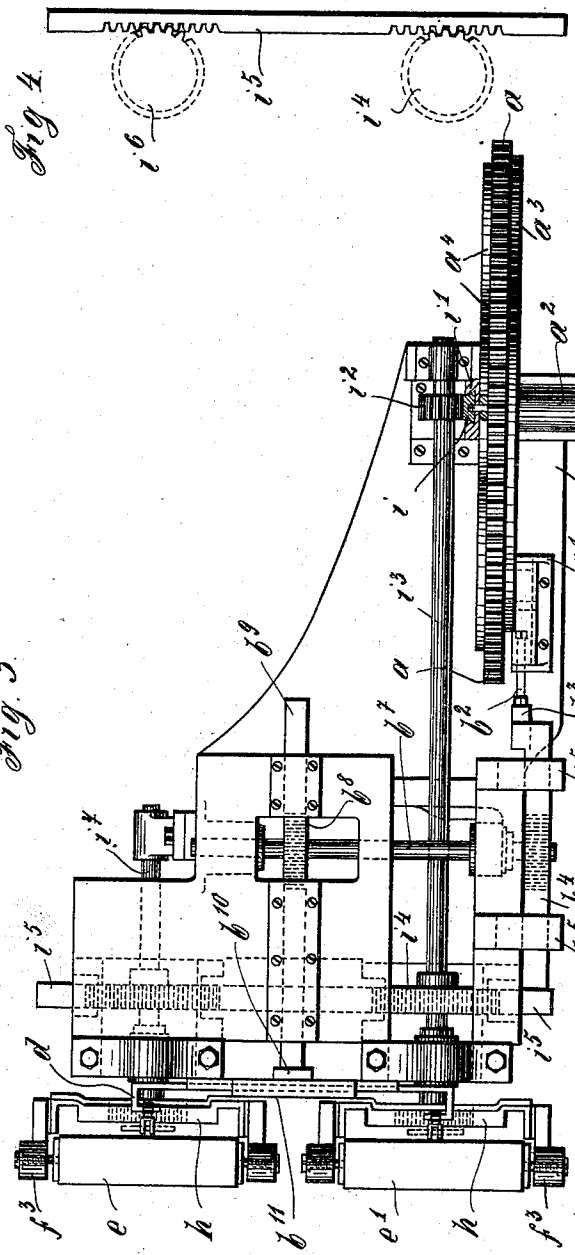

Fig. 3

Witnesses:
Arthur Walther
Emil Kayser.

Inventor:
Carl Rehse
by: Robert Tatzler
Attorney.

UNITED STATES PATENT OFFICE.

CARL REHSE, OF STRIEGAU, GERMANY.

BRUSH-MAKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 545,910, dated September 10, 1895.

Application filed January 2, 1895. Serial No. 533,608. (No model.)

To all whom it may concern:

Be it known that I, CARL REHSE, a subject of the King of Prussia, German Emperor, and a resident of Striegau, in the Province of Silesia, in the German Empire, have invented certain new and useful Improvements in Brush-Making Machines, of which the following is an exact specification.

This invention refers to machines for boring brush-blocks and furnishing the holes with the bundles of bristles. Up to now there have separate machines been employed for effecting the said two operations, and there has been caused the drawback thereby that much time and great care was necessary for properly guiding the bored brush-block below the stopping mechanism proper of the brush-block-stopping machine.

The object of my invention is to avoid the said drawback, and I attain that object, first, by uniting a block-boring machine with a stopping-machine to one machine; second, by supporting the boring-table as well as the stopping-table by universal joints, so that both may be inclined in any direction and for any angle; third, by connecting the said two tables in such a way that both are performing exactly the same movements in the same time; and, fourth, by providing for the tables a common driving mechanism, as will all be more fully described hereinafter. Together, however, with avoiding the drawback above referred to and by the means mentioned, I wish to obtain still another, and, in fact, highly important effect. The brush-blocks used by me are, on the surface receiving the bristles, not flat or plane, as is normally the case, but they are curved; and they may be curved not only in their longitudinal direction, but in their cross direction, too. In either case the holes are bored radially with respect to the two directions—that is to say, if the holes are regarded in the longitudinal direction of the brush-block the imaginary axes of the holes will seem to proceed from one point; and if the holes are regarded in the cross direction of the brush-block, the imaginary axes of the holes will also seem to proceed from one point. The said two points may coincide or may not. They will coincide if the respective surface of the brush-block forms part of the surface of a sphere. This, however, will be but seldom the case, and the said two imaginary points will thus generally lie in planes of different height, according to the difference between the two curves just in question.

It will be seen from the foregoing two paragraphs that the two tables are to move simultaneously, in such a way that the position of the block held by the stopping-table is always and perfectly equal to that of the block held by the boring-table. After a block has been bored it is transplaced to the stopping-table, and is furnished with the bundles of bristles while another block is bored. Owing to the equal positions of the two blocks worked at a time, the two holes just worked—*i. e.*, that which is bored and that which is furnished with the bristles—will always be perfectly parallel. Obtaining this constant parallelism of the respective two holes of the blocks, in spite of the radial position of the holes of each block, is the second purpose of my invention.

My improvements in the machine in question have nothing at all to do with the boring device proper or with the stopping device proper. They are relating solely to the working frames and to the mechanisms connected therewith. Therefore, in order to avoid any unnecessary complicateness of the drawings, I have dispensed in the same with the boring device, as well as with the stopping device.

In said drawings similar letters denote similar parts throughout the several views.

Figure 1 is a side view of the machine, the upper devices (the boring and the stopping device) being left away. Fig. 2 is a front view of the two working frames. Fig. 3 is a plan of the machine. Fig. 4 is a detail of the coupling between the two working frames, said coupling being intended for moving said frames sidewise to and fro. Figs. 5 and 6 are details of another coupling between the two working frames, said other coupling being intended for moving the said frames forward and backward; and Fig. 7 is a side view of one of the legs of one of the working tables.

The large cog-wheel a, Figs. 1 and 3, the short shaft a', Fig. 1, of which is held by the bearing a^2, is provided at its front side with the curved guide-pieces a^3 and at its rear side with similar pieces a^4. There are thus formed

two curved guideways, by means of which two slides (described in the next paragraph) may be displaced. One of these slides causes the two working tables to swing forward and backward. The other causes them to swing sidewise, so as to effect thereby the desired inclined position of the two brush-blocks.

Slide b, Fig. 1, is the one effecting the first-mentioned motion of the working tables. The said slide is provided with a pin and roller taking into the curved guideway a^3, and is guided itself by a small frame b', fixed to the rear table c of the machine. Slide b is connected, by means of a short rod b^2 and an adjusting-piece b^3, Figs. 1 and 3, with a slide b^4, guided by the angular projections b^5 of the frame. Part of said slide b^4 is cogged, and is in gear with a cog-wheel b^6, secured to a shaft b^7. The latter carries another cog-wheel b^8, by means of which is driven another cogged slide or rack b^9, Figs. 1, 3, 5, and 6, that is lying on a level with slide b^4, aforementioned. The front end (or, with regard to Figs. 1 and 3, left-hand end) of said rack b^9 carries, by means of a projection b^{10}, a guide composed of a shorter outer part b^{11} and a longer inner part b^{12}, Figs. 1, 3, 5, and 6. Within said guide may be displaced a slide d, the bent ends of which are coupled to the working tables e e' of the machine. This coupling is effected by means of universal joints, consisting each of of link d', Figs. 5 and 6, hinged to the respective table, and of another link d^2, hinged to the said former link, as well as to the respective end of the slide d, the connecting-pins at the two ends of the link d^2 being placed at right angles to each other. If, therefore, rack b^9 is moved in longitudinal direction, the working tables e e' will be caused to swing on the bolts e^2, Figs. 1 and 2. If, however, the frames f, holding the working tables, are caused to swing on the bolts g, Figs 1 and 2, the slide d will be displaced within its guide b^{11} b^{12}, without hindering the latter, to transmit the movement of rack b^9 upon the said tables.

Before describing the means by which the tables are caused to swing upon the bolts g, I think it useful to describe the construction of the movable tables themselves and of the movable frames holding them. As, however, the two tables, as well as the frames, are of exactly the same construction, it will be sufficient to describe but one of each of them. The table e', adapted to receive the bored brush-block, is provided with two legs e^3, Figs. 2 and 7, each of which has a slot e^4. Within said slot may be displaced and adjusted a slide e^5, which holds a long pivot e^2 and which after being adjusted in height is fixed to the respective leg of the table. As to the parts shown above the tables e and e' in Figs. 1 and 2, I think it sufficient to say that they represent the well-known mechanisms for fixing the blocks to said tables. The outer projecting ends of the pivots e^2 are carrying each a slide f', that may freely ascend or descend within a slot f^2, Fig. 1, provided in the two upper arms f^3 of the frame f. The upper ends of these arms are carrying-bolts f^4, the inner projecting ends of which take into curved slots e^6, Fig. 7, provided in exchangeable guide-pieces e^7, that are secured to the sides of the table e'. The latter is thus supported by said bolts f^4 and may swing forward or backward as far as allowed by the length of the said curved slots e^6. The curvature of the latter is corresponding to the respective curvature of the brush-block. As, however, the machine is intended for brush-blocks of all shapes and sizes, it will be clear that the said curved guide-pieces must be exchangeable. The radius of oscillation of the table e' must correspond to the radius of the curve e^6. Therefore the pivots e^2 must be adjustable in height within the legs of the table. Some forms of brush-blocks will make it necessary to lower or raise the table while the respective block is worked. In order to make such movement possible, the pivots must be allowed to freely ascend or descend within the arms of the frame f.

The two arms of each frame are connected at their rear side by an exchangeable bar h, Figs. 1 to 3, the middle portion of which is curved and is provided with teeth taking into or gearing with a cog-wheel h' or h^2, respectively. All the parts e, f, and h are thus held by said cog-wheels. The fulcrum of each of the frames f is formed by a pivot g, arranged in a slide g'. The latter may be adjusted in height within a vertical slot f^5 of frame f and may be fixed to the latter in any position, just as above described with regard to the parts e^2, e^5, and e^3. Bolt g is elongated rearward and carries a slide g^2, Fig. 1, which may freely ascend or descend within a guide-piece g^3, forming part of the main frame of the machine. The relation of the parts g, g^2, and g^3 is thus the same as above described with respect to the parts e^2, f', and f^3. The motives for this arrangement, as well as for the curved exchangeable rack h, are exactly the same as those for the former arrangement mentioned, the curve in question being now the cross-curve of the brush-block instead of the longitudinal one.

In order to move the table-frames f sidewise to and fro by the mediation of the racks h, the second of the slides operated by the wheel a, or that operated by the curved guideway a^4 of the latter, respectively, comes into action. This slide i, Fig. 3, moves vertically up and down within a guide i', fixed to the main frame of the machine, and is formed into a rack gearing with a cog-wheel i^2, arranged on shaft i^3, Fig. 3. The latter carries at its front end the cog-wheel h^2, carrying in its turn the right-hand table-frame, as afore described, and moreover, a cog-wheel i^4, Figs. 1, 3, and 4, that is in gear with a rack i^5, arranged above said wheel i^4. The other end of said rack i^5 gears with a cog-wheel i^6, Fig. 4, secured to a shaft i^7. The latter is ar-

ranged parallel to shaft i^3 and carries at its front end the cog-wheel h', carrying in its turn the left-hand table-frame. If, therefore, slide i is acted on by the curveway a^4, the two frames f, together with the tables e e', will be caused to swing from one side to the other side, and vice versa, and if, further, slide b is is acted on by the curveway a^3, the two tables alone will be caused to swing from the rear to the front, and vice versa. These two motions are alternating in such a way that if a series of holes has been bored or stopped, respectively, the block makes a movement sidewise with regard to said series of holes, and the next series is bored or stopped, respectively, in the reverse direction. This procedure is repeated until the whole block is finished.

There remain still to be described a few details. (Shown in Figs. 1 and 2.) As shown in these figures, the slide g^2, held by the pivot g, is provided with a projection g^4, Fig. 1, against which is pressing a spring g^5. The other end of the latter is resting upon the lower end of an angular piece g^6, screwed to the guide-piece g^3. Spring g^5 is thus compensating part of the weight of the frame f with the parts carried by the same, and the purpose proper of the said arrangement is to prevent the teeth of the racks h, as well as of the cog-wheels h' h^2, from being worn away too soon. Further, in order to obtain a secure contact between the teeth of the said two parts at every position, the frames f are provided each with a weight k, held by a bent arm k' in such a position that said weight is constantly tending to turn the frame upon or around the pivot g.

Having now particularly described the nature of this invention, what I desire to secure by Letters Patent of the United States is—

1. In a brush-making machine having a working table adapted to be inclined to any plane, the combination with the frame carrying said table, of another frame supporting the former by means of exchangeable bearing-pieces secured to one of said frames, and of projections secured to the other of said frames, and adapted to co-operate with said bearing-pieces; said former frame having gudgeons adapted to be moved vertically within the second frame; the latter being also supported by means of an exchangeable bearing-piece, and having a gudgeon adapted to be moved vertically within a suitable guide-piece of the frame proper of the machine, for the purpose as described.

2. In a brush-making machine having a working table adapted to be inclined to any plane, the combination with the frame carrying said table, of another frame supporting the former by means of projections secured to one of said frames, and taking into curved slots of bearing pieces secured to the other of said frames; said former frame having gudgeons adapted to be moved vertically within the second frame; the latter being also supported by means of an exchangeable bearing-piece, and having a gudgeon adapted to be moved vertically within a suitable guide-piece of the frame proper of the machine, for the purpose as described.

3. In a brush-making machine, having a working table adapted to be inclined to any plane, the combination with the frame carrying said table, of another frame supporting the former by means of exchangeable bearing-pieces secured to one of said frames, and of projections secured to the other of said frames, and adapted to co-operate with said bearing-pieces; said former frame having gudgeons adapted to be moved vertically within the second frame; the latter being supported by means of an exchangeable curved rack gearing with a cog-wheel, and having a gudgeon adapted to be moved vertically within a suitable guide-piece of the frame proper of the machine, for the purpose as described.

4. In a brush-making machine having a working table adapted to be inclined to any plane, the combination with the frame carrying said table, of another frame supporting the former by means of exchangeable bearing-pieces secured to one of said frames, and of projections secured to the other of said frames, and adapted to co-operate with said bearing-pieces; said former frame having gudgeons adapted to be adjusted in height within legs of said frame, and to be moved vertically within arms of the second frame; the latter being also supported by means of an exchangeable bearing-piece, and having a gudgeon adapted to be adjusted in height within said second frame, and to be moved vertically within a suitable guide-piece of the frame proper of the machine, for the purpose as described.

5. In a brush-making machine having a working table adapted to be inclined to any plane, the combination with the table-frame e, of another frame f supporting the former by means of bolts f^4 secured to said frame f, and taking into curved slots e^6 of bearing-pieces e^7 secured to said frame e; the latter having gudgeons e^2 furnished with slides e^5 adapted to be adjusted in height within slotted legs e^3 of frame e, and with slides f' adapted to be vertically displaced within slotted arms f^3 of frame f; the latter being supported by means of an exchangeable curved rack h gearing with a cog-wheel h', and having a gudgeon g furnished with a slide g' adapted to be adjusted in height within a slot f^5 of said frame f, and with a slide g^2 adapted to be moved vertically within a guide-piece g^3 of the frame proper of the machine, for the purpose as described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

CARL REHSE.

Witnesses:
WM. HAUPT,
R. HERPICH.