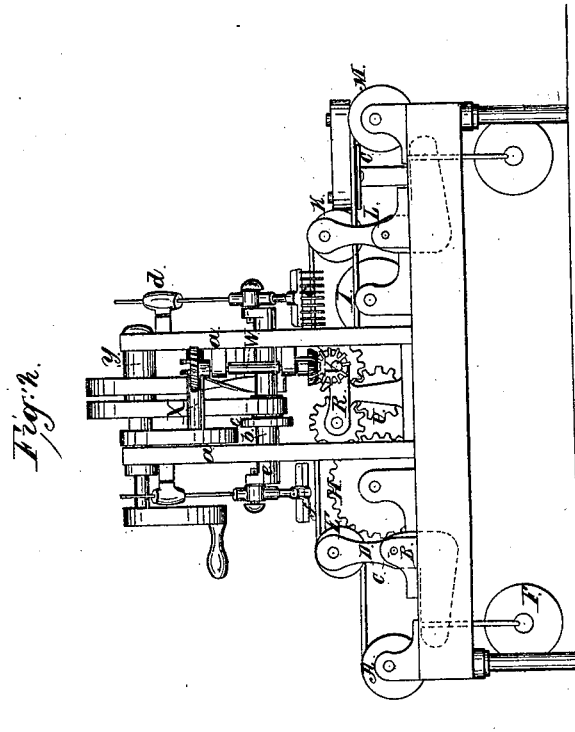
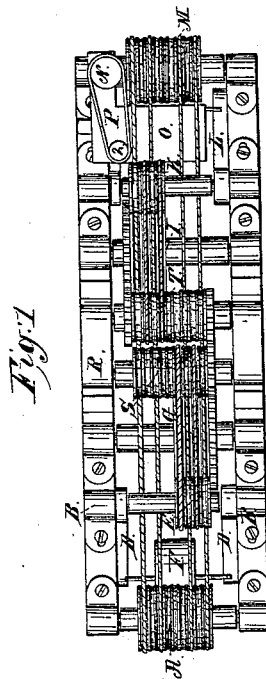
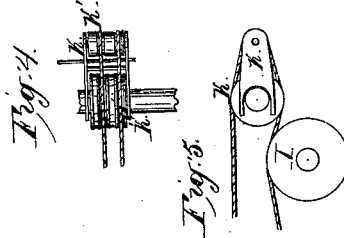
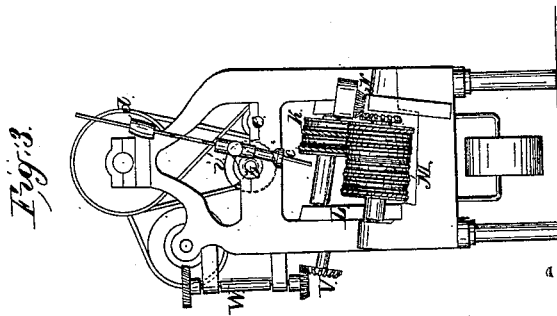


N. H. Spafford, Brush Machine.

N^o 54,034.

Patented Apr. 17, 1866.



Witnesses:
DeSoria
Chas. Horron.

Inventor
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By
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UNITED STATES PATENT OFFICE.

NATHAN H. SPAFFORD, OF BALTIMORE, MARYLAND.

IMPROVED MACHINE FOR COMBING BRISTLES.

Specification forming part of Letters Patent No. 54,034, dated April 17, 1866.

To all whom it may concern:

Be it known that I, NATHAN H. SPAFFORD, of the city of Baltimore, in the county of Baltimore and State of Maryland, have invented a new and useful Improvement in Machines for Combing Bristles; and I hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the accompanying drawings, making a part of this specification, and to the letters and figures of reference marked thereon.

The object of my invention is to provide better means than have heretofore been devised for combing bristles by machinery. To this end I construct a frame with open top and bottom, formed of upright posts, side pieces, and end pieces, as shown on the drawings, and attach thereto the following machinery and devices, namely:

On the left-hand end of said bench, as shown in Figure 1, I place the grooved pulley A. Its gudgeons work in boxes screwed onto the tops of the side pieces, and it has eight grooves on its periphery adapted to the round belts hereinafter mentioned. The front box for the gudgeon of this pulley is elevated above the other to give the pulley an oblique direction or position, inclining rearward.

Letters B B are sliding boxes adjusted on the sides of the frame by set-screws. A shaft, C, passes through these boxes, which forms a fulcrum or pivot upon which the elbow-lever next mentioned rests, and upon which it works.

The lever D is made in the form of two elbows, the upright ends of which are connected by the pulley E, and the horizontal ends of which sustain a weight, F. It is also connected by the shaft C and by a cross-bar, which unites its two parts at the elbows thereof. The pulley E is set horizontally in boxes or openings in the upper ends of the upright portions of the lever D.

The pulley G is adjusted in the frame in the same manner as pulley A. It has four grooves on its periphery, and on its front end is a cog-wheel, H.

Letter I is a pulley with a cog-wheel connected therewith, constructed and adjusted in all respects in the same manner as the pulley G, except that the cog-wheel is placed on the rear instead of the front thereof.

Letter K is a pulley attached to an elbow-

lever, L, both of which are counterparts and duplicates of pulley E and lever D with the weight thereon, except that the raised and grooved part of said pulley K is near the rear end of the same, whereas the raised and grooved part of pulley E is near the front end thereof.

The brace B', which sustains the platform O, is attached to the frame by means of a screw inserted in a slot, D. This slot enables me to move backward and forward said platform and flat belt P, thus adjusting long or short bristles to the comb.

The pulley M is constructed and adjusted in the same manner as pulley A, except that it has attached to its rear end, inside its bearings, a cog-wheel, which connects and works with the cog-wheel and drum herein next mentioned.

The drum and cog-wheel N works on an upright shaft that is fastened in a plate, O. It is connected by a flat belt, P, with another drum, Q. The drum Q also works on an upright shaft attached to plate O. The plate O is connected with the frame by a strap which extends over the end thereof, and is supported by a brace attached to the upper side of the same.

At a point about the middle of the frame I attach a second frame, (marked *a a*.) the two sides whereof are connected at their tops somewhat in the form of house-rafters. In the center of this second frame I attach to the main frame two upright standards, on the tops of which I place the caps R. The office of these caps is to furnish bearings for the journals of the pulleys S and T, hereinafter mentioned. The front standard is made higher than the rear one in order to give an oblique position to said last-named pulleys.

The pulley T has a cog-wheel at each end of its raised and grooved portion, which meshes with another cog-wheel, hereinafter described.

The pulley S has a cog-wheel on its front side, inside its bearing, which also meshes with the cog-wheel last above referred to.

On the inside of the front upright central standard I attach a cog-wheel and pinion, which meshes with the front cog-wheel on pulley T and the cog-wheel on pulley S. It is marked U on the drawings.

The shaft of pulley T extends in front beyond its bearing, and has on its extreme end a cog-wheel marked V.

I attach two arms to the front side of the right-hand column of the frame *a a*, in which I place the shaft *W*. This shaft has attached to it two cog-wheels, one at its top and the other at its bottom. The latter meshes with the cog-wheel on the front end of pulley *T*, and the latter works in a worm-gear on the horizontal shaft next mentioned.

The shaft *X* in the front posts of the frame *a a*. It has a worm near its right-hand end, which meshes with the cog-wheel on the upper end of shaft *W*. It also has a drum near its left-hand end, that is connected, by a flat belt, with the crank-shaft *Y*.

Y is a crank-shaft that has its bearings in and near the apex of the frame *a a*. It has a crank on its left-hand end and has one small and two large drums, as shown on Fig. 3 of the drawings. A flat belt works on said small drum and connects it with the drum on shaft *X*. The two large drums are designed, also, for flat belts, by which they are connected with the device next mentioned.

The frame *a a* has two connecting-beams placed about midway between the top and bottom thereof. At a point near the center of these beams, and having its bearing thereon, I place the shaft *B*. It has a small drum to the left of its center, on which a flat belt works and connects it with a large drum on crank-shaft *Y*. The right-hand end of this shaft *b* extends beyond said frame and has a crank thereon, around the handle of which I place the handle of the comb *c*. This comb has a handle of considerable length, the upper end of which moves up and down in a swinging box or stay, *d*. The bearing of the comb-handle is so adjusted on the handle of the crank that the same may revolve therein, while, at the same time, the comb must necessarily travel with the crank through its entire circuit.

Resting, also, upon a shaft in the cross-beams of frame *a a* is the shaft *e*. It has a small drum to the right of its center, by which it is connected by a belt with a large drum on shaft *Y*. The left-hand end of this shaft outside its bearing is constructed and adjusted in all respects the same as the right-hand end of shaft *b*. It likewise has a crank thereto, and there is a comb (marked *f*) attached to the same, working in all respects like the comb *c*, except that its action is reverse thereto. This reverse action is produced by crossing the belt by which it is worked.

It will be noticed that all the horizontal shafts on the main frame are adjusted with an inclination rearward. The pulleys *S* and *T* have also a similar incline together with the pulleys *E* and *K*.

My object in adjusting said machinery on such incline is as follows, to wit: It is necessary to have the butts of the bristles evenly adjusted preparatory to combing. The butts of the bristles are larger and heavier than their flags; hence, by having them carried forward on an incline, as described, with the butts down-

ward, they evenly gravitate against the flat belt *P*, and are ready to be grasped by the two sets of round belts, and held by them until the flags are combed.

Besides the flat belts hereinbefore mentioned, I affix to my machine four round belts, that pass from and around the pulley *A* and around the pulley *M*. The front pair of these belts pass under pulley *E* and over pulley *G*. They also pass under pulleys *S* and *T*, in all of which they run in grooves. The rear pair of these round belts pass under pulleys *S* and *T*, over pulley *I*, and under pulley *K*, running in grooves therein. There are also two small round belts that pass over and around pulleys *K* and *T* and over pulley *I*, and two small belts placed in a similar manner around pulleys *E* and *S* and over pulley *G*, all of which run in grooves in said pulleys.

Figs. 4 and 5 represent a device for regulating the bristles after they have been placed on the platform *O*. This device consists of a small grooved pulley, *K'*, having a shaft running through its center, whose ends revolve in the movable plates *k k*. These plates are slotted or forked at their lower ends, and stand astride the shaft of the pulley *K*, and are held together by the cross-bars *L'*.

Instead of passing the small round belts around the pulley *K*, as above described, extend them to and pass them around the small pulley *K'*, which projects forward of pulley *K* and adjusts itself to the inequalities of the mass of bristles on the platform.

My machine is operated as follows, namely: I place the bristles to be combed on the long round belts above the plate *O*, with their butts resting against the small flat belt *P*. I then turn the main crank of the machine, or I rotate the shaft *Y* by a belt, and the machinery is set in motion. The small belt *P* moves along as the round belts are moved, and guides the butts of the bristles until they pass under the pulley *K*. When the bristles have passed from under pulley *K* their butts rest upon pulley *I*, and, being held between the two sets of round belts, their tops are combed by the comb *C*. They then pass under the pulleys *S* and *T*, and while their flags rest on pulley *G*, and being held between the two sets of round belts, their butts are combed by the comb *f*. They then pass along on the belts to the left hand of the machine, and are secured for use.

The weights attached to the elbow-levers *D* and *L*, combined with the set-crews and slots in the boxes *B B*, enable me to give to the belts on the pulleys with which they connect such tension as I require, and thereby enables me to pass a larger or smaller quantity of bristles along the belts and hold them, respectively, with very nearly the same firmness and security while they are being combed. The weight *v* is placed upon the crank-shaft for the purpose of balancing said crank and combs.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. Adjusting the pulleys A, E, G, I, K, M, S, and T in an inclined position, substantially as and for the purpose herein specified.

2. The drum and cog-wheel N, drum Q, and the shafts thereto, in combination with the belt P and plate O, constructed and operated substantially as and for the purposes set forth.

3. The grooved pulleys G and I, in combination with the round belts connected therewith, for the purpose of holding the bristles while being combed.

4. The elbow-levers D and L, with the weights thereon, as described, for the purposes specified.

5. Driving the grooved pulleys G, S, T, and I direct by means of the beveled gears, upright

shaft, and worm-pinion from the driving-shaft Y.

6. The small pulley K' and plates k, constructed and operated substantially as and for the purpose set forth.

7. The weight i', in combination with the cranks, shaft, and combs, for the purpose of balancing the weight of said combs and cranks.

8. The devices herein described, or their equivalents, when combined, arranged, and operated substantially as set forth.

NATHAN H. SPAFFORD.

Witnesses:

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