3 Sheets—Sheet 1.

T. J. FERGUSON.

MACHINE FOR WASHING AND RINSING BRISTLES.

No. 185,737. Patented Dec. 26, 1876.

FIG. I

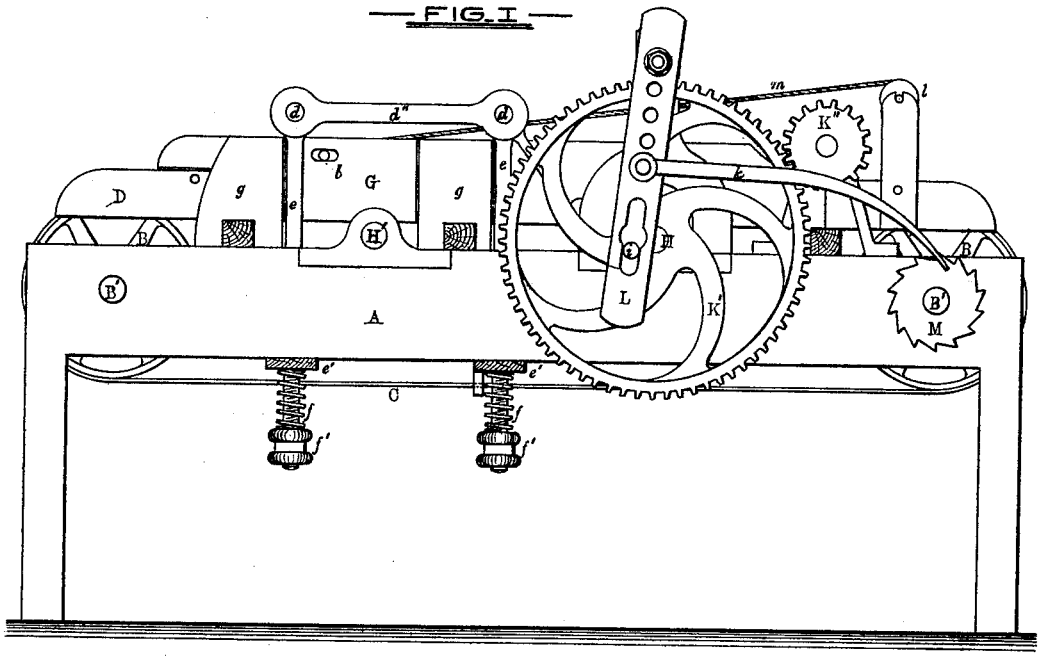
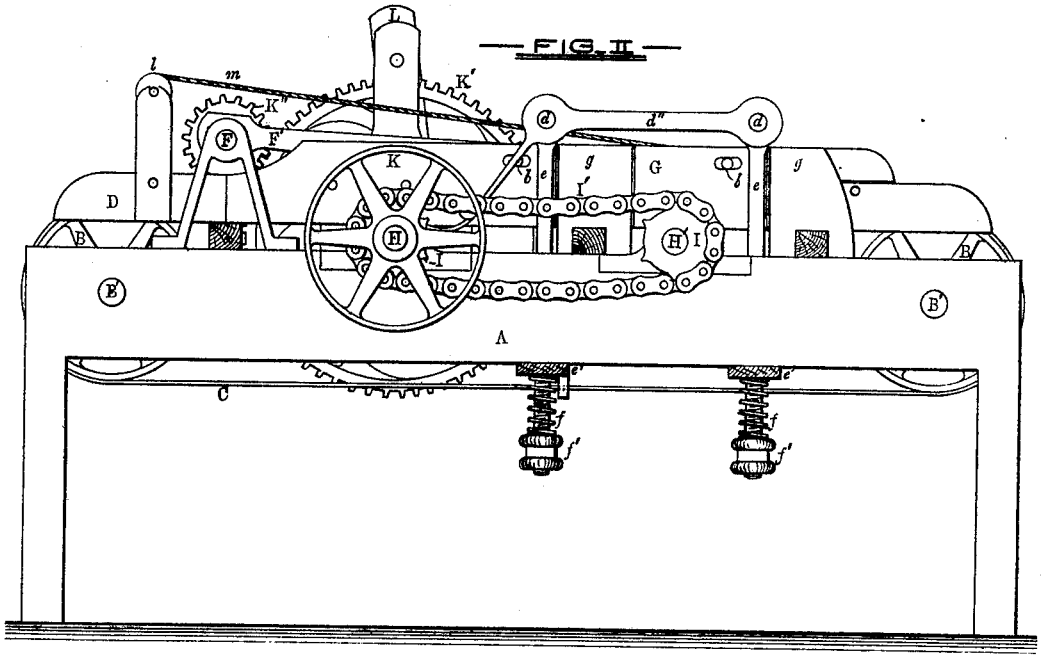


FIG. II



WITNESSES.

Leon Bacon

W. C. Chaffee

INVENTOR.

Thomas J. Ferguson

by Howard & Howard

Attorneys.

3 Sheets—Sheet 2.

T. J. FERGUSON.

MACHINE FOR WASHING AND RINSING BRISTLES.

No. 185,737. Patented Dec. 26, 1876.

FIG. III.

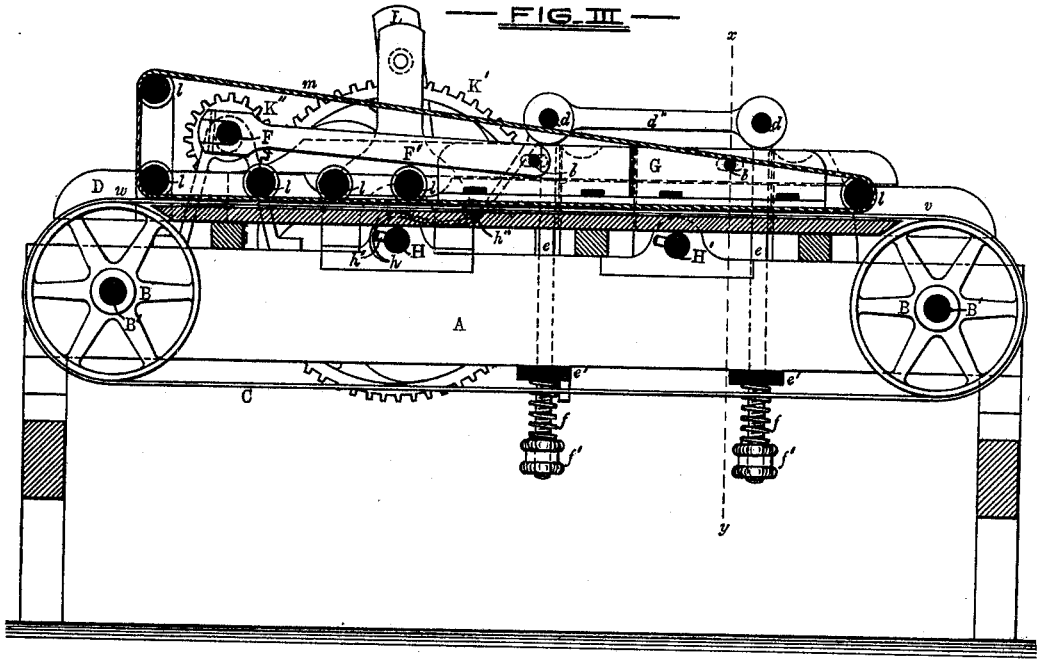
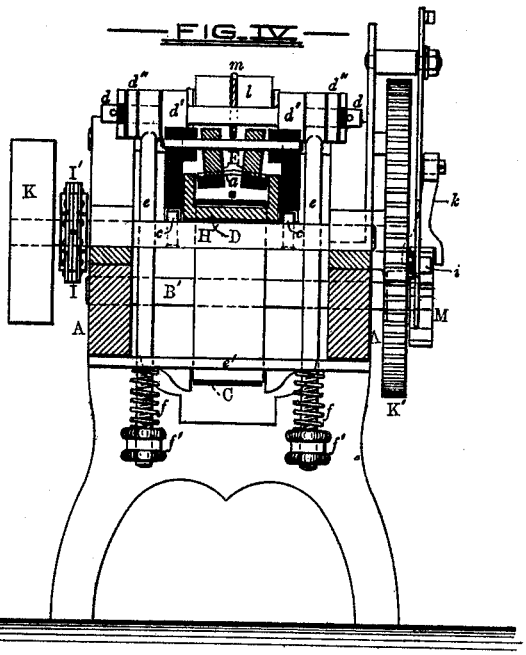


FIG. IV.



WITNESSES.

Leo. Bacon.

M. C. Ekaffer.

INVENTOR.

Thomas J. Ferguson

by Wm. J. Howard

attys.

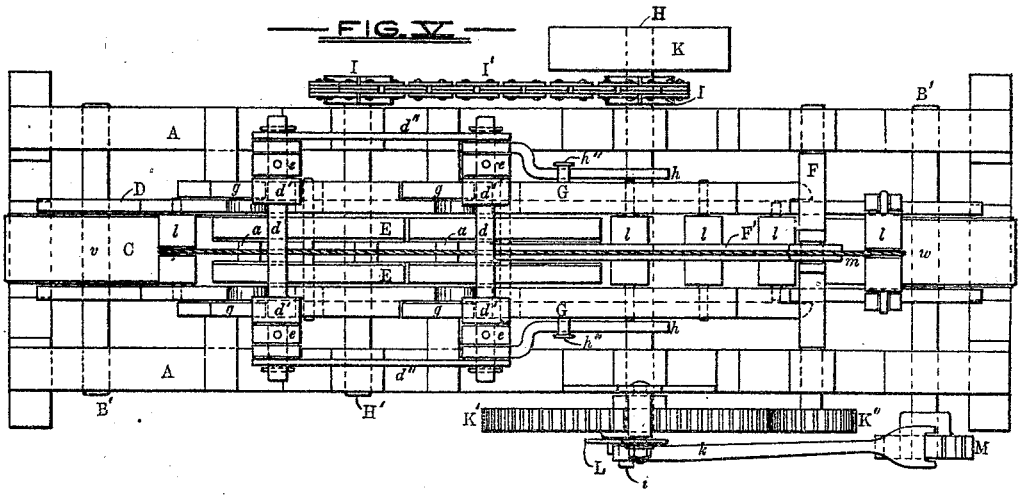
3 Sheets—Sheet 3.

T. J. FERGUSON.

MACHINE FOR WASHING AND RINSING BRISTLES.

No. 185,737. Patented Dec. 26, 1876.

FIG. V.



WITNESSES.

Levi Bacon.

M. C. Chaffee

INVENTOR.

Thomas J. Ferguson,

by Cushman & Howard,

Attys.

UNITED STATES PATENT OFFICE.

THOMAS J. FERGUSON, OF PIKESVILLE, ASSIGNOR TO WILLIAM WILKINS, OF BALTIMORE, MARYLAND.

IMPROVEMENT IN MACHINES FOR WASHING AND RINSING BRISTLES.

Specification forming part of Letters Patent No. **185,737**, dated December 26, 1876; application filed October 13, 1876.

To all whom it may concern:

Be it known that I, THOMAS J. FERGUSON, of Pikesville, in the county of Baltimore and State of Maryland, have invented certain new and useful Improvements in Machines for Washing and Rinsing Bristles, of which the following is a specification; and I do hereby declare that in the same is contained a full, clear, and exact description of my said invention, reference being had to the accompanying drawings and to the letters of reference marked thereon.

This invention relates to a machine for scouring and rinsing bristles and like substances, in which the operation of cleansing or freeing the bristles from extraneous or non-merchantable matter is performed by the action of a scourer or washer upon the bristles, which are automatically moved longitudinally of the machine, the said movement or feed being intermittent to allow the washer to come in contact with the bristles while the same are stationary upon the feeding-belt.

In the description of my improved machine which follows, due reference must be had to the accompanying drawing, forming a part of this specification, and in which—

Figures 1 and 2 are reversed side elevations of the machine, Fig. 3 a longitudinal section of the same, Fig. 4 a transverse section of the machine on the line *x y*, and Fig. 5 a plan of the invention.

Similar letters of reference indicate similar parts of the invention in all the views.

A is the frame of the machine, constructed with special reference to the free revolution of the pulleys B located at or near to the ends thereof. The pulleys B are secured to shafts B′ resting in bearings in the frame A, and are connected by the endless belt C, preferably of india-rubber, or rubber and some textile fabric mixed. That portion of the endless belt connecting the upper parts of the peripheries of the pulleys B passes through a trough, D, secured firmly to the frame A, and bears, when weight is applied thereto, upon the bottom thereof. E represents the washer, consisting of two or more strips connected by the curved bars *a*, and faced at their lower edges with india-rubber, or other elastic and pliable material. The strips forming the principal part of the washer are divided longitudinally into two or more sections, to render them, to a certain extent, pliable, and to admit of their adaptation to any irregularity in the layer of bristles operated upon in the cleansing operation. The washer E is susceptible of two motions within the trough D—a longitudinally-reciprocating motion received from the crank-shaft F through the medium of the connecting-rod F′, and a vertical movement communicated from the lifters G by means of the pins *b*. The vertical movement of the lifters G is obtained from the revoluble shafts H H′, which are provided with cams or projections *c*, adapted, in the revolution of the said shafts, to come in contact with the lower sides of the lifters. A joint movement of the shafts H H′ is effected by the addition to the same of chain-heads or wheels I, and their connection by the chain-belt I′. The shaft H is also provided with a driving-pulley, K, and master-gear wheel K′, which wheel engages with a pinion, K″, on the crank-shaft F, before alluded to.

As it is necessary in the bristle-washing operation that the bristles should be subjected to a pressure in excess of that caused by the weight of the washer and lifters, and that any additional weight placed upon the lifters should be removed as the said lifters are elevated by means of the cams *c*, I use the mechanism described below. Transverse rods *d*, having collars or rollers *d′*, are coupled by the bars *d″*, and secured to the vertical rods *e* extending through cross-pieces *e′* on the frame A. The lower ends of the vertical rods are provided with spiral springs *f* and adjusting-nuts *f′*, the said springs occupying that portion of the vertical rods between the said nuts and the cross-pieces *e′*. By means of these springs and nuts any desired tension may be placed upon the transverse rods and the parts of the machine upon which they rest.

In order to place the tension of the transverse rods alternately upon the lifters, and upon some stationary portions of the frame not connected thereto, the said lifters are notched, and rigid uprights *g* extending from

the frame, constructed to fit loosely in the said notches, and the transverse rods moved backward and forward, or to and from the lifters and uprights.

The devices preferably employed to shift the transverse rods, as described, consist of the hooked springs *h*, which extend over the shaft H, and are thrown in one direction by lugs *h'* as the said shaft revolves.

A reverse movement of the transverse rods is also obtained by the springs *h*, but independently of the lugs *h'*, it being caused by the resilient action of the springs, or their tendency to assume their original shape after being bent or curved in the former movement by contact with pins *h''*, extending from the sides of the lifters. From this it will be seen that in the revolution of the shaft H the tension of the spiral springs, through the medium of the vertical rods *e* and transverse rods *d*, is alternately placed upon the lifters G and stationary uprights *g*, the latter position admitting of the free elevation of the said lifters by means of the mechanism hereinbefore described.

A partial rotary movement of the pulleys B, at each revolution of the master-wheel K', and consequently an intermittent longitudinal motion of the endless belt C, are effected through the pendent arm L, crank-pin *i* on the outer face of the master-wheel, and the pawl *k*, which engages with the ratchet-wheel M on the shaft B'. The extent of the intermittent movement of the endless band and pulleys is subject to variation by altering the vertical position of the pin, forming the connection between the pawl and pendent arm, and to this end a series of holes are provided, each one of which is adapted to receive the pin.

Parts of the machine, not yet considered, will be described, and their uses fully set forth in the description of the operation of cleansing bristles by means of my invention, which follows: The machine being set in motion the bristles to be washed are laid or spread crosswise on the endless belt at the part thereof indicated by *v*. Upon the advance of the endless belt the bristles are carried toward the washer, and finally as the washer is elevated, as before described, are conducted beneath it. As the washer, which has a continuous longitudinal reciprocating movement, derived from the crank-shaft F, comes in contact with the bristles, the said bristles are scoured between it and the then stationary belt, which scouring continues until the washer is again elevated to admit of a further advance of the belt. The master-wheel K' and pinion K'' are of such relative sizes as will produce a rapid scouring motion of the washer, with a comparatively slow intermittent feed movement of the endless belt; consequently the scouring operation is repeated several times before the discharge of the bristles from the trough at *w*. During the scouring operation a soapy, or other washing liquid, is introduced to the trough from pipes, and escapes at the sides of trough, which are reduced in height at one or more places for the purpose. Water is also introduced to the trough to rinse the bristles after their passage from underneath the washer, and in order to facilitate the latter operation the bristles are passed under rollers *l*, which serve to squeeze out the water and partially dry them.

A cord, *m*, is combined with the rollers *l* in such manner as to place a slight pressure upon the bristles during the entire washing operation, and prevent their disarrangement as the washer is elevated from contact therewith.

By reference to Fig. 4 of the drawings it will be seen that the rubber faces of the washer, which is shown as elevated, are not parallel with the surface of the belt, but form a curve, being raised slightly at their inner edges. This curvature of the rubber faces corresponds nearly with the form of the layer of bristles, caused by the diminished size of the bristles at their ends, and serves to prevent the too rapid escape of the soapsuds from the sides of the trough.

Having thus described my invention, what I claim as new, and wish to secure by Letters Patent of the United States, is—

1. In a machine for washing and rinsing bristles and similar substances, the flexibly-faced washer E, combined with mechanism for imparting to the same longitudinally-reciprocating and vertically-reciprocating movements, substantially as and for the purposes herein specified.

2. The washer E, with mechanism for giving to it the movements described, combined with the trough D and intermittently-feeding belt C, substantially in the manner and for the purposes set forth.

3. The washer E, crank F, connecting-rod F', lifters G, and shafts H H', provided with cams or projections *c*, combined substantially as herein specified, whereby a longitudinally-reciprocating and a vertically-reciprocating movement are transmitted to said washer, for the purposes described.

4. The lifters G and the washer E connected thereto, combined with the pressure-rollers *d'* and mechanism for causing said rollers to exert, intermittently, a pressure upon the said lifters, and through them upon the said washer, substantially as and for the purposes specified.

5. The lifters G, adjustable pressure-rods *e*, coupling-bars *d''*, transverse rods *d*, springs *h*, cam-shaft H, having lugs *h'*, cam-shaft H', and means for imparting to said shafts a common rotary movement, all combined in a bristle-washing machine, substantially as and for the purposes specified.

6. The washer E, connecting-rod F', and crank-shaft F, combined in a bristle-washing machine, with the pinion K'', master-wheel K', and shaft H, substantially as specified, and for the purposes set forth.

7. The pinion K″ with its crank-shaft for operating the washer, the shaft H, master-wheel K′, crank-pin *i*, pendent arm L, and pawl *k*, combined in a bristle-washing machine, with the ratchet-wheel M, the shafts B′, pulleys B, and endless belt C, substantially as described.

8. In a bristle-washing machine the trough D, rollers *l*, and cord *m*, substantially as and for the purpose specified.

In testimony whereof I have hereunto subscribed my name this 27th day of September, in the year of our Lord, 1876.

THOMAS J. FERGUSON.

Witnesses:
GEORGE H. HOWARD,
THOMAS MURDOCH.