No. 850,645. PATENTED APR. 16, 1907.

W. H. HEFFERNAN & A. E. HALL.

MACHINE FOR CLEANING CARPETS.

APPLICATION FILED MAY 8, 1905.

5 SHEETS—SHEET 1.

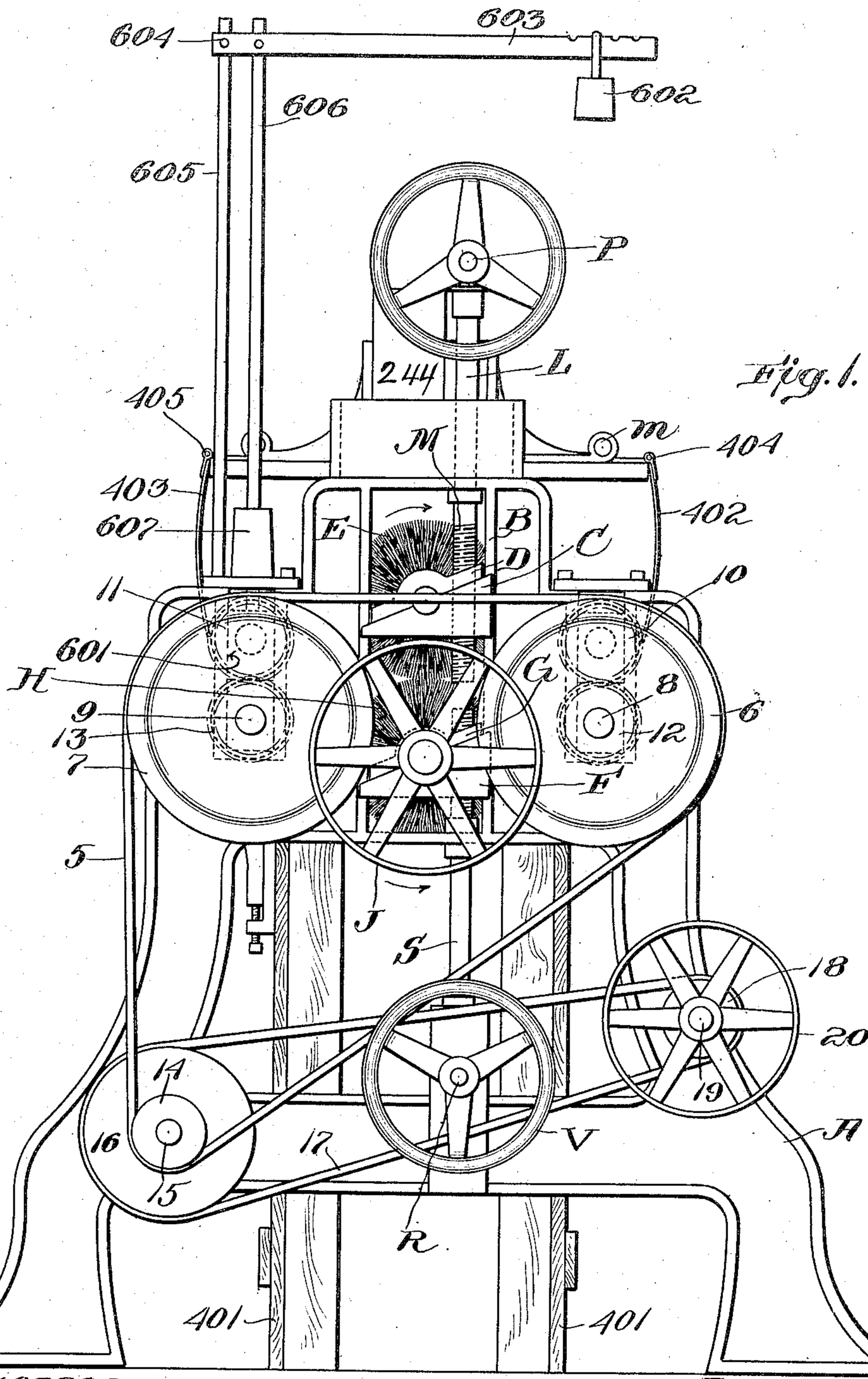

Fig. 1.

Witnesses:
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Wm. A. Copeland

Inventors:
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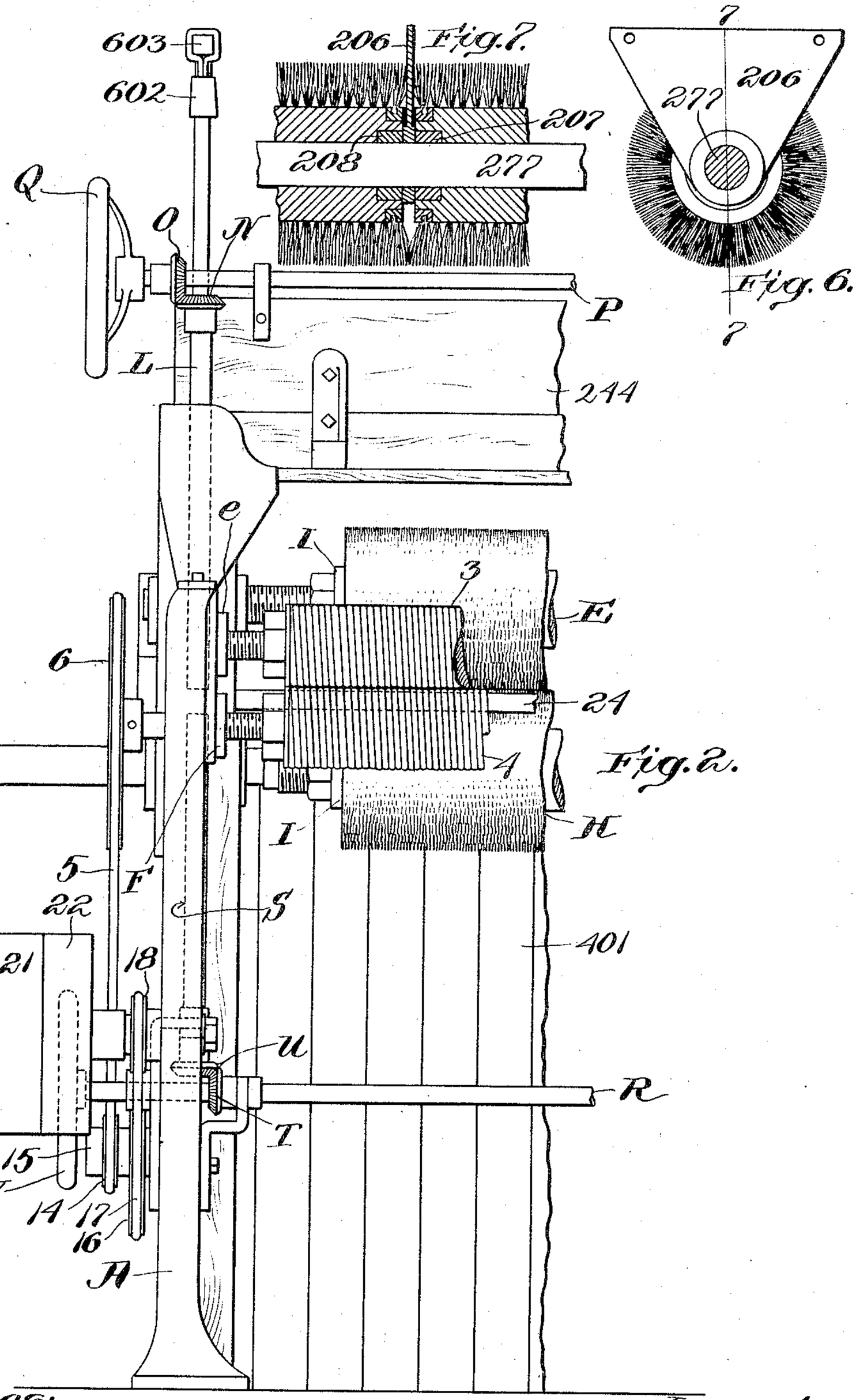

Fig. 2.

Fig. 6.

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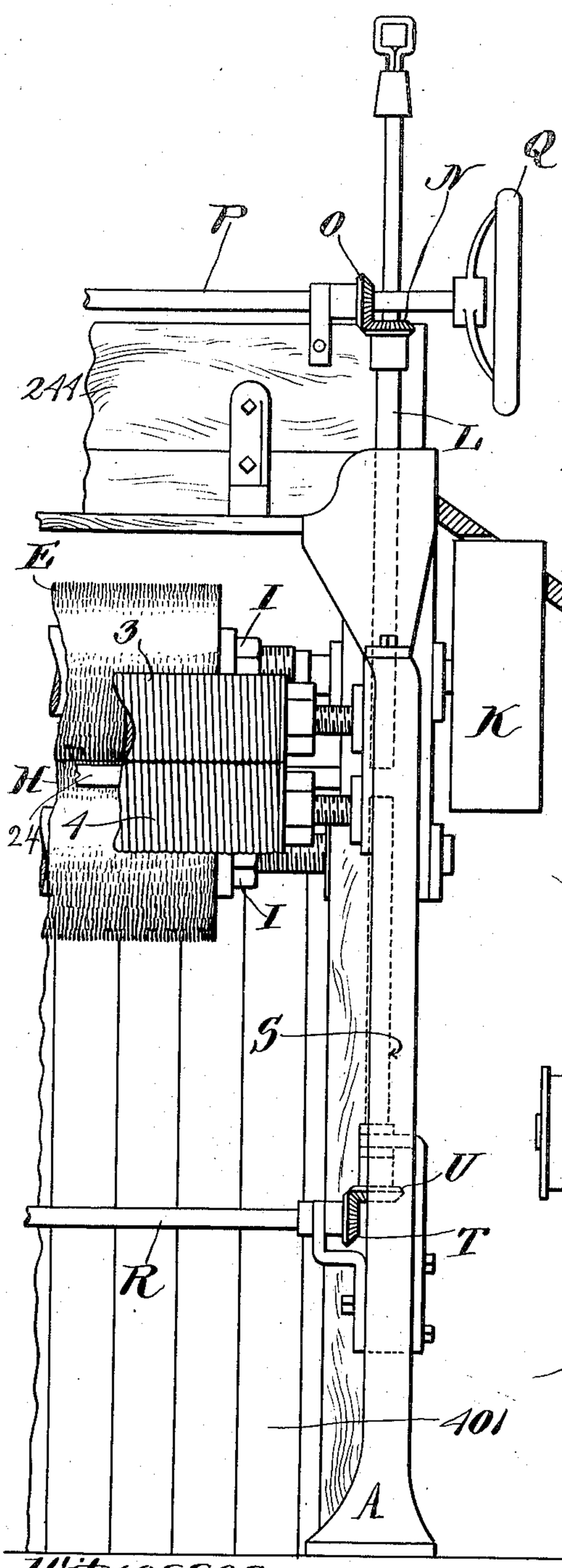


Fig. 3.

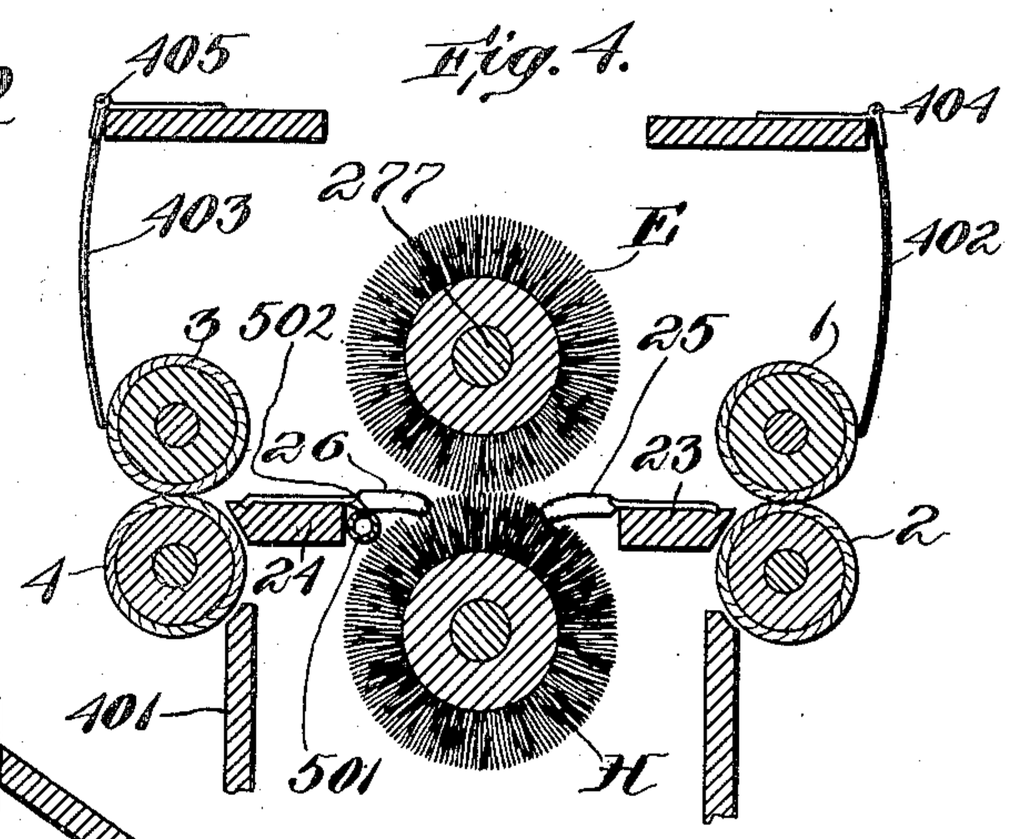
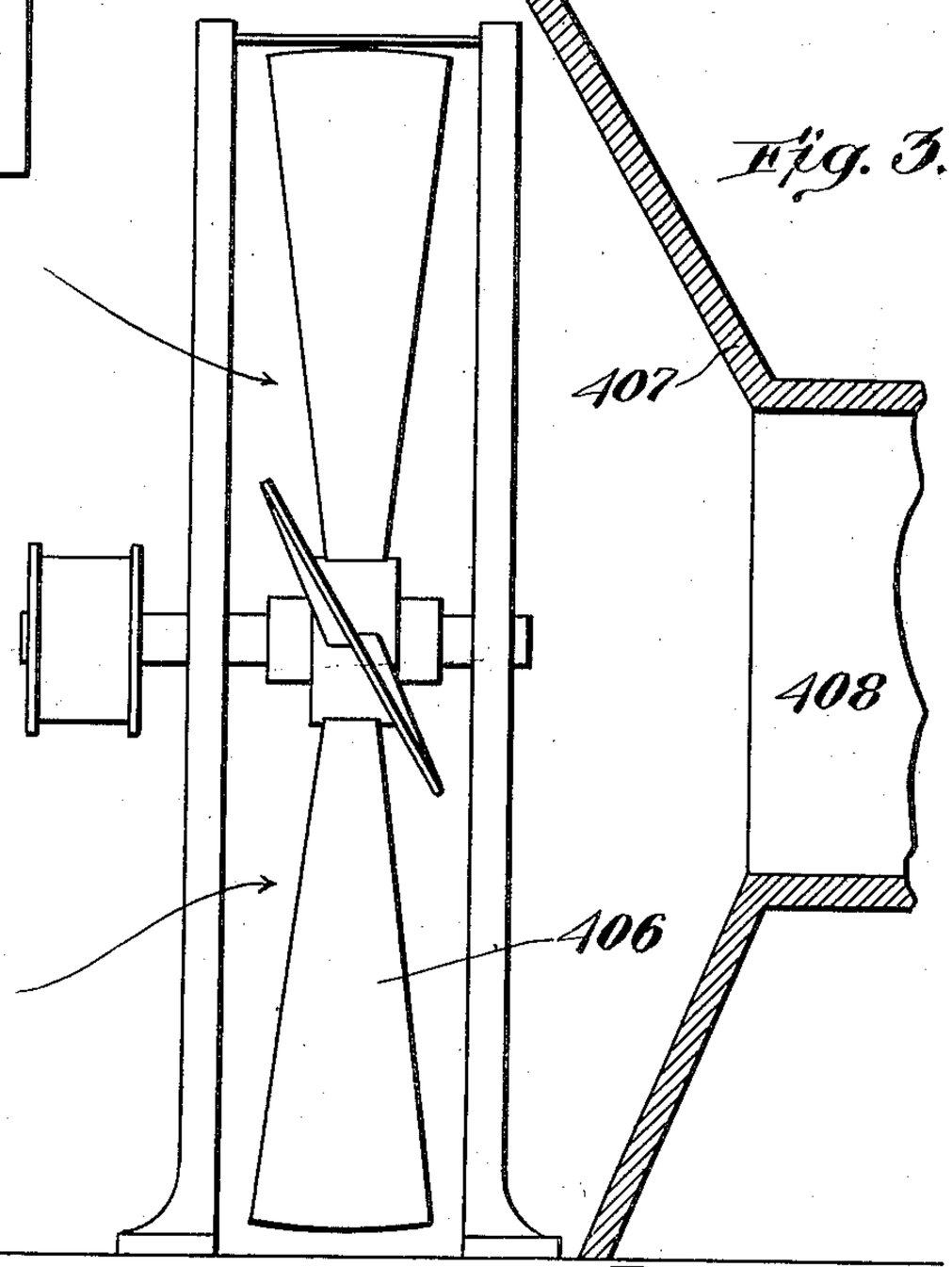


Fig. 4.



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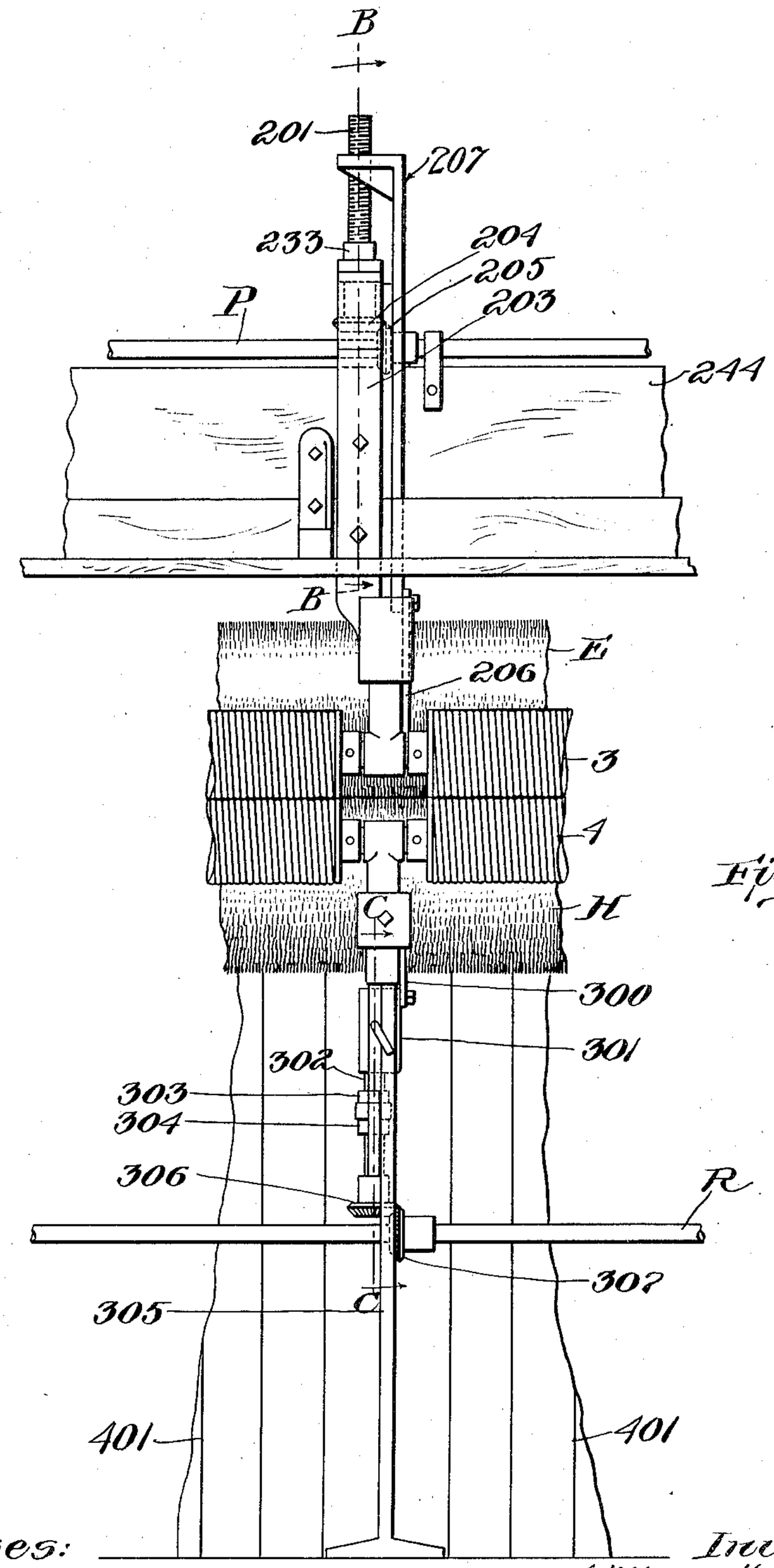

Fig. 5.

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5 SHEETS—SHEET 5.

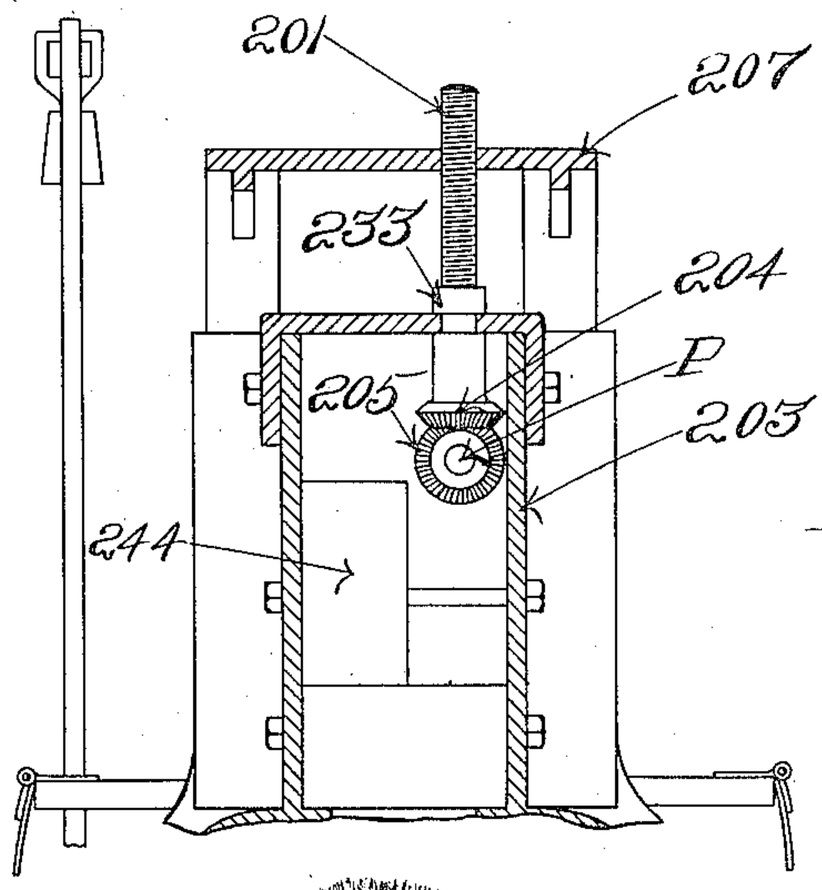

Fig. 8.

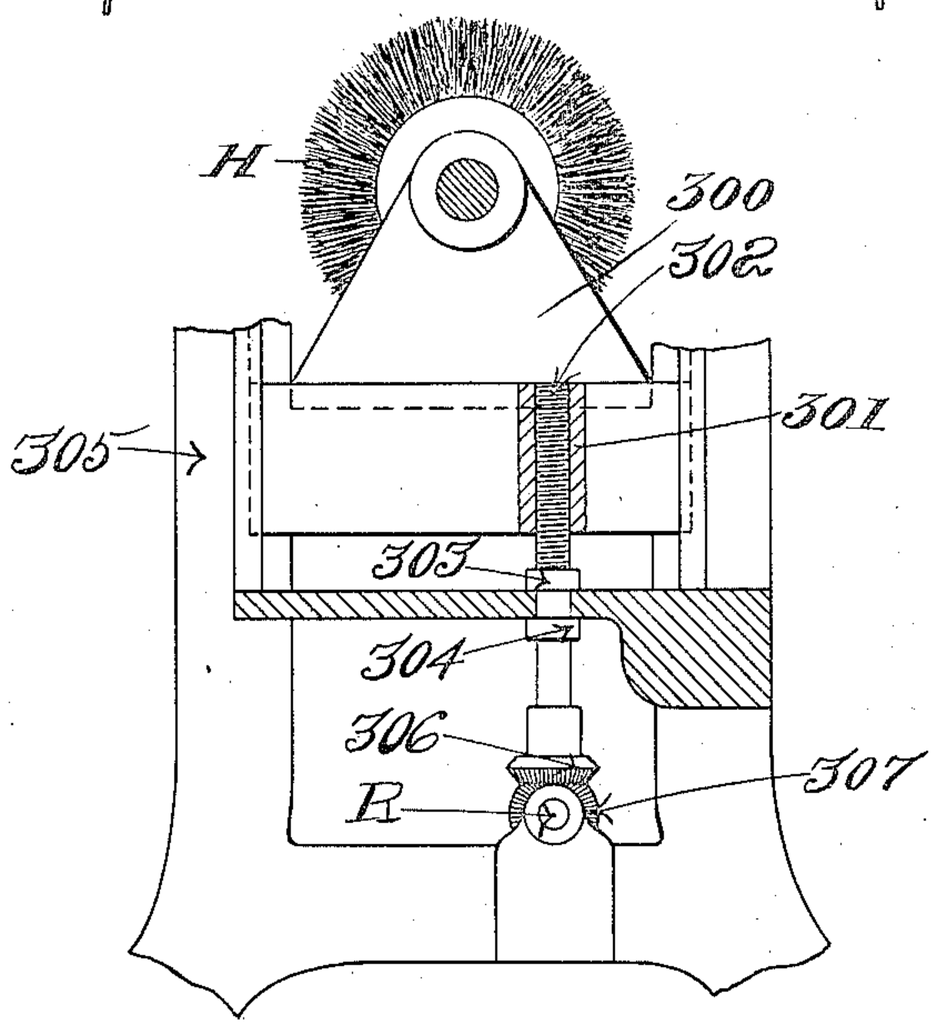

Fig. 9.

Witnesses:
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UNITED STATES PATENT OFFICE.

WILLIAM H. HEFFERNAN, OF NORTH ADAMS, AND ALMON E. HALL, OF WILLIAMSTOWN, MASSACHUSETTS.

MACHINE FOR CLEANING CARPETS.

No. 850,645. Specification of Letters Patent. Patented April 16, 1907.

Application filed May 8, 1905. Serial No. 259,280.

To all whom it may concern:

Be it known that we, WILLIAM H. HEFFERNAN and ALMON E. HALL, citizens of the United States, residing at, respectively, the said HEFFERNAN at North Adams, Berkshire county, Massachusetts, and the said HALL at Williamstown, in said county of Berkshire, have invented a certain new and useful Improvement in Machines for Cleaning Carpets, of which the following is a specification, reference being had therein to the accompanying drawings.

Our invention has for its object to provide a machine for cleaning all kinds of carpets, rugs, and similar articles, particularly those provided with pile-surfaces and having stiff or heavy backing which makes them liable to be injured while being cleaned. The machine embodying our invention is also adapted to clean thoroughly all kinds of carpets, rugs, and similar articles and also to disinfect or steam the article during the cleaning process. The machine is rapid in its operation and is arranged so that the dirt and lint removed from the carpet is carried off without injury or discomfort to the operator.

Referring to the drawings, Figure 1 is an end elevation of a machine embodying our invention. Fig. 2 is a side elevation of one end of the machine shown in Fig. 1. Fig. 3 is a similar view of the other end of the machine, partly in section for convenience in showing the fan and dust-chamber. Fig. 4 is a detail in section showing the relation of the feed-rolls, brush-rolls, and other parts. Fig. 5 is a side view of the central portion of the machine, showing the adjustable supporting means for the brush and feed rolls. Fig. 6 is a section through the upper brush-roll, showing the central support therefor. Fig. 7 is a longitudinal section on line 7, Fig. 6. Fig. 8 is a vertical section on line B B, Fig. 5, looking in the direction of the arrows. Fig. 9 is a vertical section on line C C, Fig. 5, looking in the direction of the arrows.

In the drawings there is indicated at A (see Figs. 1 and 2) the frame of the machine, upon which the various operative parts are supported. The frame A is provided at B with guides or ways, in which the halved boxes C and D, which support the upper brush-roll E, and the corresponding halved boxes F and G, which support the lower brush-roll H, are free to move vertically for the adjustment of the said brush-rolls with relation to each other. These brushes or brush-rolls E and H extend the whole length of the machine and may be as long as is required to clean the largest carpet for which the machine is to be used. In practice we make the brush-rolls in sections, which are firmly held together longitudinally by means of collars I. (See Figs. 2 and 3.) Where very long brushes are required, the said rolls are supported at their centers or at other convenient points in a manner to be hereinafter described. The two brushes E and H are driven independently of each other and in the direction indicated by the arrows in Fig. 1. The lower brush-roll H is driven by a belt on the pulley J at the left hand of the machine, as seen in Fig. 2, while the upper brush-roll is driven by a second belt on the corresponding pulley K at the other end of the machine. (See Fig. 3.) The said brushes are adjustable vertically with regard to each other in the following manner. An adjusting-screw L, located at the end of the machine (see Figs. 1 and 2) and suitably supported in the frame of the machine, is provided at its lower end with threads M, which engage a corresponding hole in the box C, and at its upper end with a bevel-gear N, which meshes with a second bevel-gear O on the horizontal shaft P, supported on the upper part of the frame A of the machine. The said shaft P extends the whole length of the machine. The other end of the machine is similarly provided with a vertical shaft for vertical adjustment of the boxes and with a corresponding set of elements. We also provide an adjusting-screw 201 (see Figs. 5 and 8) at or near the middle of the brush-rolls, this adjusting-screw 201 being operated by the horizontal shaft P, as are the adjusting-screws L at each end of the machine. This central adjusting-screw 201 (see Fig. 8) is provided with a collar 233 and is free to rotate in a hole in a bracket 203, fast to the cross-beam 244. The adjusting-screw 201 is provided with a bevel-gear 204, which meshes with the bevel-gear 205 on the horizontal shaft P, so that the said adjusting-screw 201 is rotated by the movement of the horizontal shaft. The upper end of the adjusting-screw 201 passes through a correspondingly screw-threaded hole in a bracket 207, to the lower end of which is at-

tached the triangular collar-piece or hanger 206. (See Figs. 6 and 7.) This hanger is made quite thin at the point where it passes between the bristles of the brush-roll and thicker where it engages the axle 277 of the brush-roll, so that a sufficient bearing-surface on the brush-roll axle is provided without separating the bristles so much that an uncleaned streak is left on the carpet. Bushings 207 and 208 are inserted in the ends of the sections of the brush-rolls at the points where they bear against the hanger 206 to relieve the friction. It will thus be seen that when the hand-wheel Q at either end of the machine is turned by the operator the boxes supporting the upper brush-roll are simultaneously raised or lowered, according to the direction in which the said hand-wheel is turned. The lower boxes F for the lower brush-roll H are similarly adjustable, there being a longitudinal shaft R, vertical adjusting-screws S, gears T and U, and a hand-wheel V provided for this purpose. The lower brush-roll is adjustably supported at or near its middle in a manner similar to that previously described in connection with the upper brush-roll. An inverted hanger 300, (see Figs. 5 and 9,) similar to the hanger 206, (see Fig. 6,) is provided with a screw-threaded collar 301, through which passes the adjusting-screw 302, provided with the collars 303 and 304, which engage a bracket on the upright 305, forming a part of the frame of the machine. The lower end of this adjusting-screw is provided in the manner heretofore described with a bevel-gear 306, which meshes with the gear 307 on the lower horizontal shaft R, so that the adjusting-screw 302 is given a movement in unison with the corresponding adjusting-screws S at the ends of the machine. As we find it necessary to adjust the lower brush-roll less frequently than the upper, we have provided a hand-wheel at the left-hand end of the machine only. By the means just described we are enabled to adjust the brushes E and H with relation to each other, so that they will exert any desired amount of pressure upon the carpet which passes between them.

As the surface of the brush-rolls is slightly uneven and the bristles or other material which compose the said brush-rolls vary slightly in elasticity and thickness, it is found that there is an interaction between the two brush-rolls on the opposite sides of the carpet, which gives to the bristles, a combing effect and imparts to the carpet a slight vibratory movement and causes the dust and lint contained therein to be released, so that the same may be removed by the bristles or fibers comprising the brush-rolls.

The carpet is fed to the brush-rolls E and H by means of two pairs of feed-rolls 3 and 4 at the front of the machine and 1 and 2 at the back of the machine. These feed-rolls are covered with some convenient material—as, for instance, cord or rope—which takes a firm grip upon the carpet capable of holding it against the pull of the brush-roll.

The feed-rolls are driven by means of a belt 5, which passes over a pair of pulley-wheels 6 and 7, fast to the axles 8 and 9 of the front and back lower feed-rolls, respectively. The upper feed-rolls 1 and 3 are driven by means of gears 10 and 11, the said gears being indicated in the drawings by their pitch-circles, which mesh with corresponding gears 12 and 13 on the shafts 8 and 9 of the two lower feed-rolls. The belt 5 passes over a third pulley 14 on a stub-shaft 15 on the lower part of the machine, the said stub-shaft being driven by a pulley-wheel 16 and belt 17, which passes over the other pulley 18 on the counter-shaft 19. This counter-shaft 19 is provided with three pulleys 20, 21, and 22, upon which are located an open and a crossed belt (not shown) driven from a suitable source of power. The center pulley 21 of the three is fast to the counter-shaft 19 and is accordingly driven by whichever belt of the two is upon the said pulley 21, the two belts being shifted simultaneously one way or the other by a belt-shifter in the well-known manner, not necessary to be described. It will be seen, therefore, that means is hereby provided by which the direction of rotation of the counter-shaft 9, and therefore of the two pairs of feed-rolls, may be reversed by the operation of a belt-shifter when desired. As the article to be cleaned varies somewhat in thickness and as it is desirable that a uniform pressure be applied to the carpet by the said feed-rolls, we mount the rear upper feed-roll in a box 601, movable vertically, and cause the same to be pressed downwardly by means of a weight or series of weights 602, supported at the end of an arm 603, fulcrumed at 604 to the fixed arm 605 on the back of the machine. The force of the weight 602 is transmitted to the upper feed-roll through the arm 606, which is guided at 607 on the frame of the machine. A similar arrangement of parts may be applied to the upper front feed-roll, if found necessary or desirable.

In the operation of our machine the edge of the carpet is inserted between the front pair of feed-rolls 3 and 4, which draw it into the machine. It then passes between the brushes and is grasped by the rear pair of feed-rolls, the brushing taking place during its movement in this direction. When the carpet has passed nearly through the machine, the operator reverses the direction of rotation of the feed-rolls, and the carpet is then drawn back again toward the front of the machine. The brush-rolls E and H continue to rotate in the same direction all the

time, and the carpet is therefore dragged back against the action of the brush-rolls. It is during this reverse movement of the carpet that the most effective cleaning takes place.

In order that the carpet may pass from the feed-rolls to the brushes without any danger of wrapping about the brushes, and thus being torn or otherwise injured, we provide finger-boards 23 and 24, (see Fig. 4,) having thereon a series of fingers 25 and 26, the ends of which embed or bury themselves somewhat in the surface of the bristles composing the brush-roll, so that the carpet is guided to the point of contact of the said brush-rolls. The fingers 25 and 26 upon the finger-boards 23 and 24 may be placed at convenient intervals throughout the machine, their frequency being determined by the size and character of the articles to be cleaned in the machine. These fingers require to be placed much nearer together in a machine to be used on small or thin and flexible carpets than in machines to be used for large and stiff carpets, because a thin flexible carpet requires to be supported at more frequent intervals to prevent it being drawn into the mechanism unevenly, and thus injured.

In order that the dirt and other matter removed from the carpet may be satisfactorily disposed of without injury or inconvenience to the operators, we house the working parts of the machine. The housing for the lower parts of the machine is indicated at 401 and consists of sheathing of wood or other suitable material. The housing for the upper part of the machine is shown at 402 and 403 and consists of canvas or other suitable material supported on a light framework and hinged to the frame of the machine at 404 and 405. At 406 is indicated a fan inclosed by the housing 407, which connects with the housing of the machine just described and serves to draw the air together with the dust and other matter removed from the carpet and expel them through the exhaust-pipe 408. The opposite end of the macihine is open to allow ingress of air. By this means the dirt removed from the carpet is immediately driven into the outer air and is prevented from coming in contact again with the cleaned portion of the carpet or doing injury to the operator.

As it is frequently desirable that the carpet or article to be cleaned be subjected to the action of steam or a spray of some disinfecting material, we provide a longitudinal pipe 501, (see Fig. 4,) which runs along parallel with the lower brush-roll and underneath the fingers 26. The pipe is provided with slots or holes 502 at convenient intervals, by means of which the steam or disinfectant is allowed to escape and come in contact with the surface of the carpet as it passes between the brush-rolls. We are thus enabled to steam or disinfect the carpet while the cleaning operation is taking place and are not required to spread the carpet upon a floor for the purpose of disinfecting.

What we claim is—

In a machine of the character specified, the combination of a frame, a pair of oppositely-disposed brush-rolls acting at substantially the same point on opposite sides of an article to be cleaned, boxes mounted in the said frame, central supports for the said brush-rolls, adjusting-screws for the said boxes and central supports, gears thereon, a horizontal shaft provided with gears engaging the gears on the said adjusting-screws for the upper brush-roll, and a corresponding horizontal shaft similarly provided with gears for adjusting the lower brush-roll, whereby the boxes and supports for each brush-roll may be adjusted vertically and simultaneously by the rotation of the horizontal shaft appertaining thereto.

In testimony whereof we affix our signatures in presence of two witnesses.

WILLIAM H. HEFFERNAN.
ALMON E. HALL.

Witnesses:
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LYMAN A. HUNT.