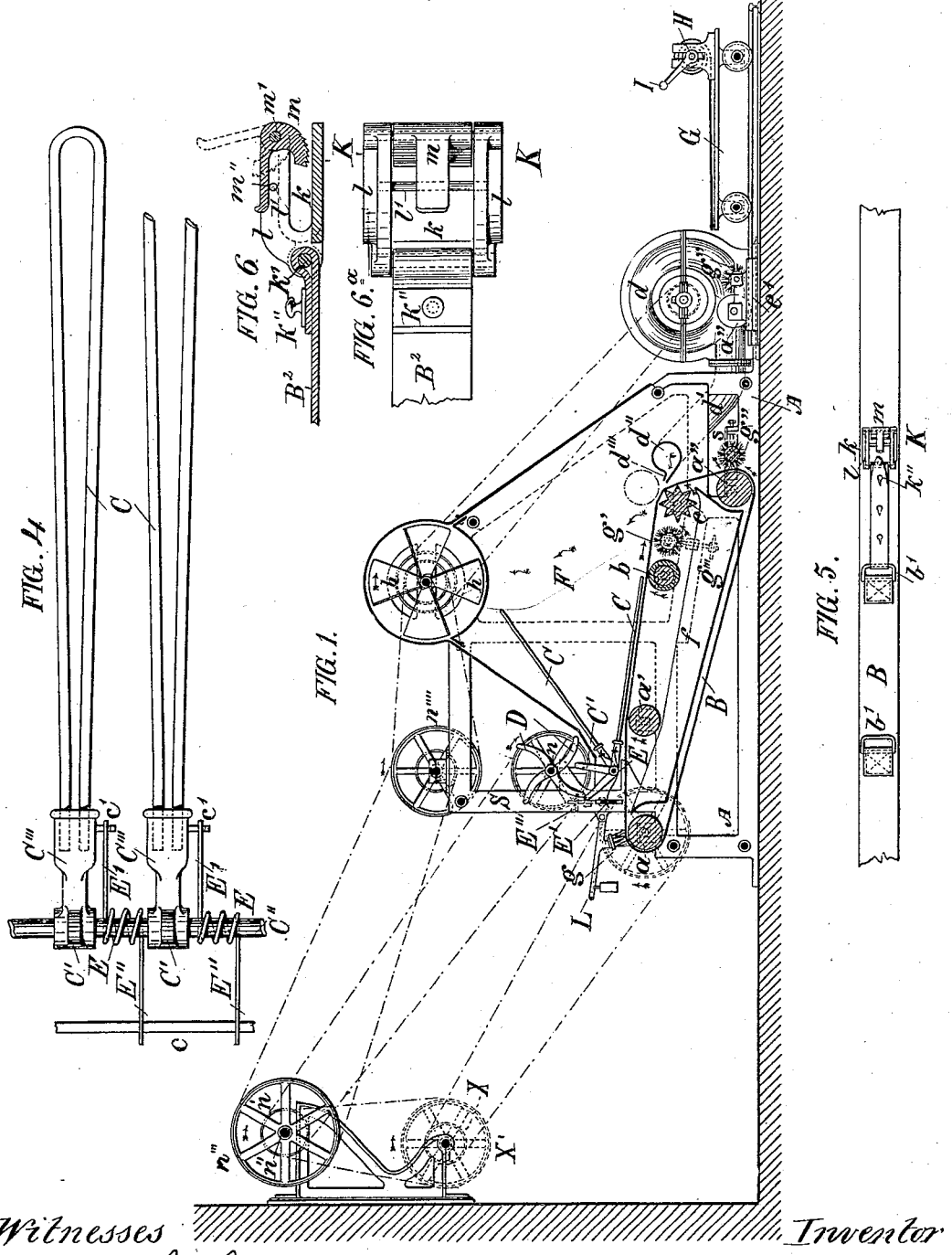
(No Model.) 3 Sheets—Sheet 1.

M. BEITMILLER.

CARPET CLEANER.

No. 262,352. Patented Aug. 8, 1882.



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(No Model.) 3 Sheets—Sheet 2.

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CARPET CLEANER.

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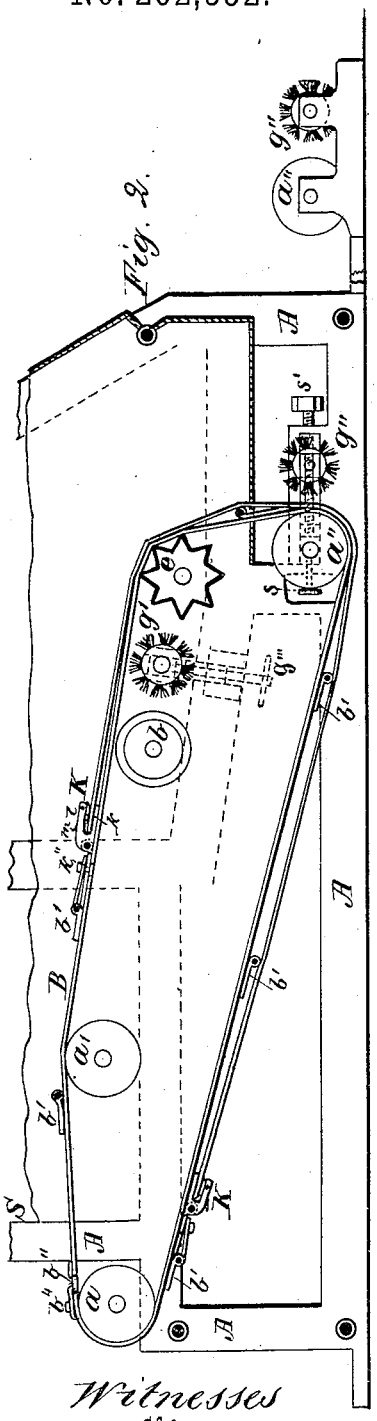

Fig. 2.

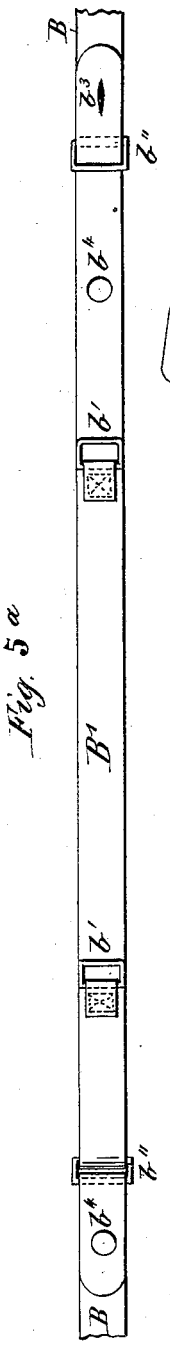

Fig. 5 a

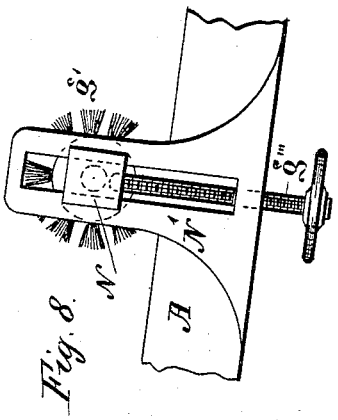

Fig. 8.

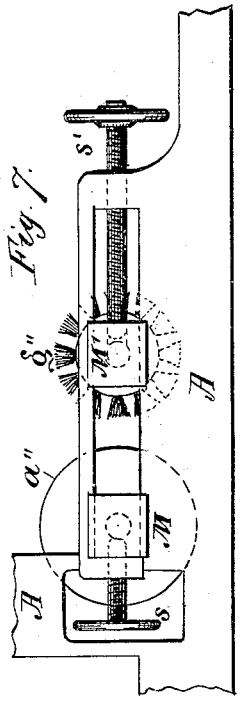

Fig. 7.

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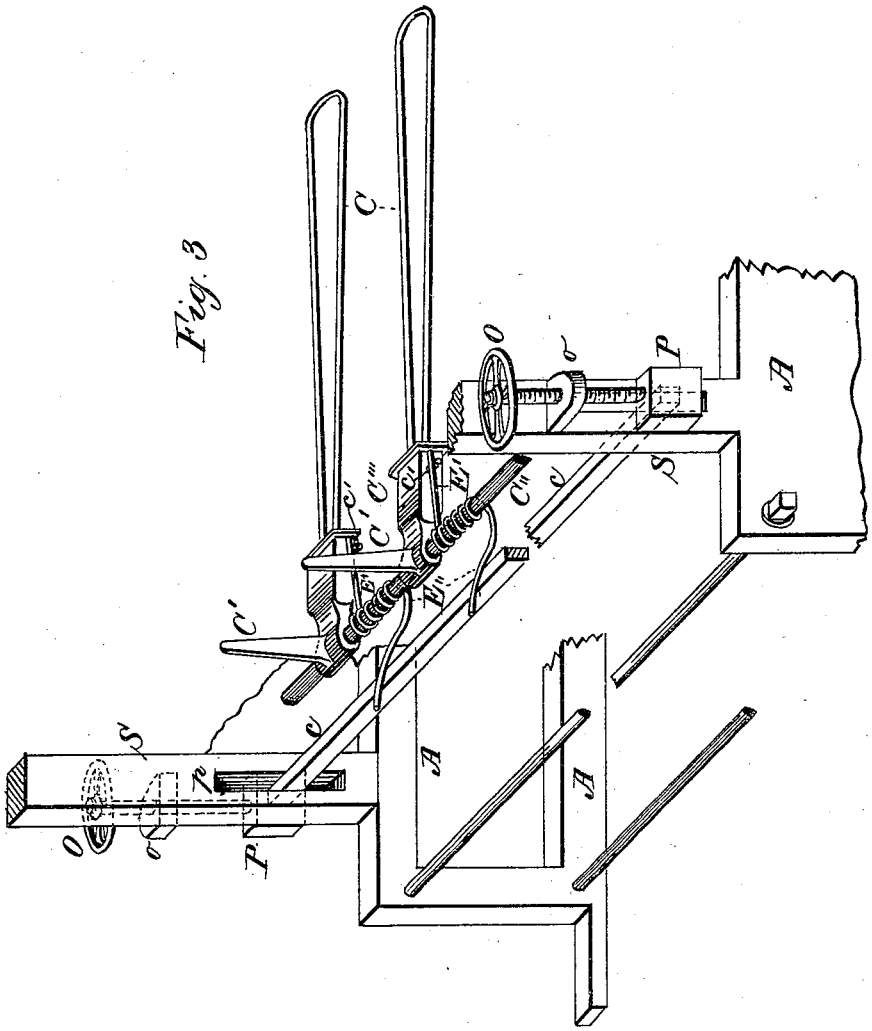
Fig. 3



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UNITED STATES PATENT OFFICE.

MARTIN BEITMILLER, OF VIENNA, AUSTRIA-HUNGARY, ASSIGNOR TO MAYER, LANGFELDER & HAMMERSCHLAG, OF SAME PLACE.

CARPET-CLEANER.

SPECIFICATION forming part of Letters Patent No. 262,352, dated August 8, 1882.

Application filed September 5, 1881. (No model.) Patented in France February 3, 1881, No. 140,936, and in Austria-Hungary April 10, 1881, No. 11,852 and No. 4,734.

To all whom it may concern:

Be it known that I, MARTIN BEITMILLER, a subject of the Emperor of Austria-Hungary, residing at Vienna, Austria-Hungary, have invented certain new and useful Improvements in Carpet-Cleaners; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

The object of my invention is to produce a machine whereby carpets or other analogous fabrics may be more effectually freed from dust or dirt, and whereby the wear resulting from such operations may be greatly reduced; and to that end the invention consists, first, in a novel method of cleaning carpets, substantially as hereinafter fully specified; second, in the combination, with beaters, of means to adjust the force of the blows thereof, substantially as hereinafter more fully described; third, in a novel arrangement and construction of devices for mounting a carpet in the form of an endless belt upon carrying-rolls, substantially as hereinafter more fully described; fourth, in the combination, with the beaters, of an elastic or yielding roll to support the carpet and sustain or receive the impact of the beater ends and cause them to rebound, as and for the purpose specified hereinafter; fifth, in the combination, with a blast-pipe, of a ribbed roller to raise and divide the nap of the carpet after it has been subjected to the action of the beaters to facilitate the removal of the dust by means of a blast of air; and, lastly, the invention consists in certain details of construction and combination of parts, as hereinafter more fully described.

In the accompanying three sheets of drawings, Figure 1, Sheet 1, is a vertical longitudinal section of the machine. Fig. 2, Sheet 2, is an elevation of the lower part thereof, one side of the main frame and part of the housing being removed. Fig. 3, Sheet 3, is a perspective view of so much of the machine as is necessary to illustrate the means employed for adjusting the tension of the beater-springs. Fig. 4, Sheet 1, shows in plan part of the beater-shaft. Figs. 5 and 5ª, Sheets 1 and 3, show respectively part of the endless belt and belt-sections and the means for uniting the same. Figs. 6 and 6ª, Sheet 1, show respectively in sectional elevation and plan view the clamp employed for clamping the carpet to the endless belt; and Figs. 7 and 8, Sheet 2, show devices for adjusting one of the carrying-rolls and the brush-cylinders.

Like letters of reference are employed to indicate like parts in the above-described figures of drawings.

The cleaning of carpets has heretofore been effected by beating in the open air or by passing the carpet through a machine, within which it is subjected either to the action of beaters or to a succession of concussions to remove the dust or dirt, and finally the carpet has in some cases (after clearing it of dust) been subjected to the action of a blast of steam.

The mere beating or brushing, or both, of a carpet is not sufficient to remove all the fine dust that has accumulated in the weft and adheres to the fibers of the nap. I have found by experience that the nap becomes too much matted together after the carpet has been in use for any length of time to permit the escape of all the dust by the action of beating or beating and brushing.

My improved method of cleaning carpets consists of the following successive steps: first, combing or brushing the carpet to loosen and raise the fibers of the nap; second, beating the dust out of it or loosening the same by means of blows; third, dividing the fibers of the nap to expose the weft after brushing the dust that may adhere to the under side of the carpet; fourth, removing the dust and dirt from the weft and fiber by a blast of air; and, finally, again brushing the carpet.

It will be seen that by this method the matted fibers of the nap will first be disentangled and straightened out after the dust has been thoroughly loosened and a large part thereof removed. The nap is again divided, and the remaining dust removed therefrom by a blast of air, after which the carpet is again subjected to a final brushing.

In the accompanying drawings I have shown a machine that is especially constructed for carrying out the above process, and has in itself many novel devices for more effectually carrying out said process.

Before proceeding to clean the carpet it is secured to endless carrier-belts to form itself an endless belt, said carrier-belts being constructed and the carpet secured thereto in the following manner: B is one of the carrier-belts, of which two or more are employed, according to the width of the carpet. To these belts are attached, at suitable distances apart, loops b'. One end of the belt has a loop, b'', and the other end is provided with a button-hole, b''', and in rear thereof with a button, b^4. To form this belt into an endless belt that end thereof which has the button and button-hole is passed through the loop at the other end, doubled over, and secured upon the button, as plainly shown in Figs. 2 and 5^a. If it is desired to increase the length of this belt, it will only be necessary to insert as many sections of belting B', Fig. 5^a, as is necessary, said sections being constructed substantially like belt B. Supposing it to be necessary to lengthen belt B, Fig. 2, this may be readily done by first unbuttoning the end of said belt, then slipping the end of one of the sections B' that has the button b^4, Fig. 5^a, through the loop b^2 on one end of belt B and securing it to button b^4. The end of belt B that has the button-hole and button is next slipped through a like loop, b^2, on section B', and secured to button b^4. In this manner any number of sections may be readily inserted to increase the length of belt B or removed to decrease the same. The carpet is secured to the belt by clamping each of its ends to a clamping device, K, constructed as follows, and shown on an enlarged scale, Figs. 6 and 6^a.

It will be seen that by means of the loops b' carpets shorter than the belts themselves may be carried thereby, as shown in Fig. 2, and by means of the belt-sections B' the belts B may be lengthened to carry any desired length of carpet.

The clamp K consists of a plate, k, that carries two arms, l, in which is pivoted a cam-lever, m, the cam-face of which is serrated. The construction of the lever is such that when turned upon its pivot m' into the position shown in dotted lines, Fig. 6, its cam-face will be moved upward between the jaws out of the way, and one end of the carpet may then be inserted between the plate and cam-lever. By turning the said lever back until its lever-arm rests upon the stop l' the cam-face is moved down upon the carpet and clamps the latter securely to the plate k. The latter plate may have its face serrated, if desired, though this is not indispensable, as I have found in practice that the cam-lever will grip the carpet with sufficient force to hold it securely. At its rear end the clamp carries a pin, k', to which is attached a short strap, B^2, that carries a button, k'', which strap serves to secure the clamps to the carrier-belts B.

Each carpet end having been secured in two or more clamps K, according to the number of belts employed, (which number, as above stated, is governed by the width of the carpet,) said clamps are attached to the belts B. This is effected by passing the short strap B^2 through one of the loops b' and then doubling it over and securing it to button k'', as shown in Figs. 2 and 5. The carpet is now placed upon two carrying rollers, a and a'', the latter roller being adjustable toward or from the former roller to adjust it to the length of carpet to be cleaned. This adjustment may be effected by means of set-screws or in any other well-known manner for adjusting or shifting the shafts of such rollers in their bearings, as hereinafter described.

By means of the above-described clamping device the carpet is better protected against tearing at the edges than by any other means within my knowledge.

Before the carpet is subjected to the process of cleaning it is acted upon by a brush, g, attached to a weighted lever, L, pivoted to the uprights S of the frame of the machine. The pressure at which the brush is to bear upon the carpet may be adjusted by shifting the weight toward or from the lever fulcrum or pivot, and said brush is thus made to yield to any obstruction. This brush acts upon the carpet as a comb to straighten out the matted or tangled fibers of the nap, and loosens the same, so that the dust or dirt may readily be removed by the cleaning devices. These devices, together with the carrying-roll a'', are mounted within a box or housing, F, that in general has the form of a pyramid or truncated cone. Upon the top of this housing is located a suction-fan, h, that carries off the fine dust and dirt not collected by the receptacle or dust-pan f, located below that part of the carpet acted upon by the cleaning devices, or the major part of them. The pan f extends from the carrying-roll a to the carrying-roll a'', the carpet to be cleaned traveling over said pan in one direction and under the fan in a reverse direction. By means of this arrangement of dust-pan any dust or dirt not taken off by the suction-fan is collected and prevented from falling upon that part of the carpet that has not been acted upon by the cleaning devices or that has already been cleaned. After the carpet has been subjected to the action of the brush g it is acted upon by a series of beaters, C. These beaters are made of cane preferably, though wood, rubber, leather, and metal may be employed. The object of using these substances is to impart to the beaters more or less flexibility to avoid the wear resulting from the action of said beaters. The beaters C are bent to form a loop, as shown in Figs. 3 and 4, the ends thereof being secured in a socket formed on a holder, C''', that has a sleeve through which passes the shaft C'',

upon which said holders are loosely secured in any convenient manner. Each holder C''' has an arm, C', that projects into the path of the lifting arms or cams D, mounted upon a shaft, *n*, that has its bearings in the framing of the machine. This shaft *n* is located above the beater-shaft and parallel therewith.

Upon the beater-shaft C'' are also mounted springs E, one extremity, E', of which bears upon a stud or pin, *c'*, that projects from the holders C'''. The other extremity, E'', of said springs extends rearward and bears upon a cross-rail, *c*. These springs serve to throw the beaters C down upon the carpet after being lifted by the cams D.

To adapt the machine for cleaning fabrics of various textures—that is to say, to clean carpets of coarser or finer texture—it is necessary that the force of the blows of the beaters should be regulated accordingly. For this purpose various devices may be employed. For instance, a set-screw may be used for each spring end E'', said set-screw being arranged to bear upon and more or less depress said end, according to the violence of the blows to be delivered by the beaters; or means for raising or depressing the rail *c* upon which the ends E'' of the springs E are made to bear may be employed. In the latter case all the springs can be adjusted simultaneously, as will be readily understood. In Fig. 3, Sheet 3, I have shown on an enlarged scale the means employed for effecting this adjustment.

The standards S of the main frame A are slotted, as shown at *p*. The rail *c* passes through these slots, its ends being attached to slide-blocks P. The latter blocks are attached to adjusting-screws O, that operate in bearings *o*, secured to standards S. It is evident that when said screws are rotated in one direction the rail *c*, upon which the spring ends E'' bear, is raised and the tension of the springs increased, while on rotating the screw in a reverse direction the rail is depressed and the tension of the springs diminished, whereby the force of the blow delivered by the beaters C is increased or diminished correspondingly.

A scale may be applied to the framing indicating the power of the blow delivered by such beater when the regulating devices are adjusted.

To still further protect the carpet against the wearing action of the beaters, I employ two supporting-rollers, *a'* and *b*. The former is located at or near the rear end of said beaters and the latter at a point where the front end of the beaters strikes the carpet. The roller *b* is covered with a thick layer of some flexible material, such as rubber, felt, or other yielding textile fabric. This roller sustains a portion of the impact of the beaters C, and causes them to rebound after delivering their blows.

The cams D are so arranged upon their shaft that each beater is raised after the preceding beater has delivered its blow or is about to deliver its blow—that is to say, their action is not a simultaneous but a successive one; and in order to increase the efficiency of their action and at the same time decrease the wearing effect of the blows I arrange the carrying-rolls *a a''* so as to cause the carpet to travel in a direction from the beaters on an inclined plane, as shown by Figs. 1 and 2. This may be effected by locating the roller *a* higher than the roller *a''*, as shown; or it may be effected by using rollers of different diameters.

In rear of the roller *b* is a revolving brush, *g'*, that serves to remove all the dust that sifts through and adheres to the under side of that portion of the carpet acted on by the beaters C, or any dust or dirt that may be caused to adhere to the under side of said carpet portion by the pressure of the roller *b*. This brush is adjustable vertically by means of a set-screw, *g'''*.

As shown by Fig. 8, Sheet 2, the trunnions or brush-cylinder-shaft ends have their bearings on opposite sides of the frame in blocks N, that slide in the slots of standards N', said blocks being supported by the adjusting-screws *g'''*, that work in bearings formed in said standards, and by means of which screws the brush-cylinder may be raised or depressed to increase or decrease its pressure upon the carpet.

In rear of the brush *g'* is located a ribbed roller or a roller that is star-shaped in cross-section. The ribs of the roller *e* are faced with a flexible material—such as leather or felt—or a textile fabric to prevent the sharp edges of the ribs from cutting the carpet as it moves over it. The object of this ribbed roller is to divide the fibers of the nap of the carpet and expose the weft to the action of a blast of air from any suitable blowing-engine located on the outside of the housing F.

As shown in Fig. 1, air is forced by a blast-fan, *d*, through a pipe, *d'*, into the blast-pipe *d''*, that has a slot or slit, *d'''*, through which the air is forced upon the carpet to remove the dust or dirt yet adhering to the fibers of the nap or to the weft.

Although I prefer to use the air-blast, a brush shown in dotted lines, Fig. 1, may be used instead.

In addition to the air-blast I employ a brush, *g''*, located immediately in rear of the carrying-roller *a''*, for the purpose of giving the carpet a final brushing. This brush is also adjustable toward or from the roller *a*, either independently of or with the roller *a''*, by shifting the bearings of said rollers by means of a set-screw or set-screws, *s*. In Figs. 2 and 7 I have shown these adjusting devices on an enlarged scale. The trunnions or shaft ends of the rollers *a''* and brush-cylinder *g''* have their bearings each in a block, M M', that slide in a slot formed in the main frame A or a suitable slotted bearing attached thereto. The blocks M M' are respectively connected with adjusting-screws *s s'*, that work in suitable bearings, and by means of which the roller and brush

may be adjusted longitudinally of the machine and relatively to each other.

When carpets of greater length than usual are to be cleaned I shift the roller a'' and the brush g'' from their bearings and transfer them to the bearings e', located outside of the housing F, or else I employ an additional roller a'' and brush g'', mounted in such bearings, e', as shown in Fig. 1.

When the carpet has been cleaned the blast-fan may be stopped, and, if desired, a blast of steam may be projected upon the carpet through the blast-pipe d''. In this case the pipe d' is provided with a suitable valve, which is closed to prevent the steam from entering into the fan-case. The carpet is then detached from the carrying-belts B, and one edge thereof is clamped between the two halves of a split shaft, H, which latter is then placed in suitable bearings mounted upon a truck, and the carpet is wound into a roll ready for delivery by rotating the two-part shaft by means of a suitable crank, I.

In the drawings I have shown a truck traveling on rails. Any other truck or suitable vehicle may, however, be used, and the bearings for the shaft may be located on the wagon, so as to bring them in close proximity to the machine. As each carpet is wound into a roll this is removed from the bearings and placed upon the wagon until the latter is sufficiently loaded for delivering, or until the carpets cleaned are all wound into rolls. As these split shafts are not removed previous to delivery, I employ wooden shafts, which can be made at a trifling expense and left to be removed by the owner of the carpet.

It will of course be understood that the brushes g g' g'', the rollers a a' a'' b e, and the blast-pipe d'', as well as the dust-pan f, extend across the whole width of the machine, and are made of such a length as to clean carpets of all widths.

The machine may be operated by hand, though this would be impossible with large and heavy carpets, and in practice I drive it from any suitable prime motor through the medium of a driving-pulley, X, belted to a driven pulley on the shaft of the roller a, from which latter shaft the brushes g' g'' and the carrying-roll a'' are driven.

A second pulley, X′, upon the driving-shaft is belted to a pulley, n', on a shaft, n'', from which is driven the shaft n, that carries the cam-arms D, and through the medium of a second pulley, n''', and the pulley n'''' the suction and blast fans are operated, as shown in Fig. 1.

Having now described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The herein-described method of cleaning carpets, which consists in the following successive steps, to wit: first, combing or raising the nap; second, beating and brushing the carpet to loosen and remove the dust; third, dividing or opening the nap to expose the weft, and removing the dust therefrom by a blast of air; and, finally, again brushing the carpet, substantially as set forth.

2. In a carpet-cleaning machine, the combination, with two or more carrying-belts, of clamping devices detachable from and adjustable upon said belts to hold the opposite edges of a carpet, whereby carpets of different lengths may be stretched upon said belts, as described.

3. In a machine for cleaning carpets, the combination of two or more carrying-belts adjustable as to length, with clamping devices detachable from and adjustable upon said belts to hold the opposite edges of the carpet, whereby said carrying-belts and clamping devices can be adjusted to carry carpets of different lengths, as described.

4. The combination, with the clamp K, constructed as set forth, and provided with a pin, k', and strap B^2, having button k'', of the belt B, provided with loops b', all constructed for operation substantially as and for the purpose specified.

5. In a carpet-cleaning machine, a pair of carrying-rolls and an endless belt provided with a series of loops, b', attached to said belt at different points, in combination with clamps provided with straps B^2 and buttons k^2, whereby carpets of varying lengths may be carried by said belts, as set forth.

6. In a carpet-cleaning machine, the combination, with the looped beaters C, of a concussion-roller covered with flexible material to receive the impact of the beater ends and cause them to rebound, substantially as and for the purpose specified.

7. The combination, with the beaters C, of the carrying rolls a a' a'' and the elastic roll b, substantially as described, for the purpose specified.

8. The combination, with the carrying-rolls a a'', the beaters C, and the blast-pipe d'', of the ribbed roller e, all constructed and arranged for operation as and for the purpose specified.

9. The combination, with the adjustable carrier-belts B and the adjustable carrying-roller a'', of the adjustable brush g'', substantially as and for the purpose specified.

10. The combination, with the endless belts B, the carrying-rolls a a'', the ribbed roll e, and the blast-pipe d'', of the brush g'', all constructed and arranged for operation substantially as shown and described.

11. The combination, in a carpet-cleaning machine, of beaters, an air-blast pipe, a brush to straighten the fibers of the nap of the carpet previous to its being subjected to the action of beaters, a brush to clean the dust from the under side of the carpet, a ribbed roller to divide the nap prior to subjecting the carpet to the action of the air-blast, a brush to finally clean the carpet, and suitable carrying-rolls, all constructed and arranged for operation substantially as shown and described.

12. In a carpet-cleaning machine, a dust pan or receptacle, a series of carrying-belts for supporting the carpet, arranged to travel around said dust-pan, a series of beaters, and a brush to act upon the upper and under side of the carpet, respectively, located above the dust-pan, an air-blast pipe to remove the dust not removed by the beaters, and a blast-fan to carry off the dust not collected by the dust-pan, all arranged for operation substantially as and for the purpose specified.

13. The combination, with the beater-shaft, the springs E, the beaters, and their holders C‴, having each a pin, c', of the vertically-adjustable rail c, slide-blocks P, adjusting-screws O, and the slotted standards S, all arranged for operation substantially as and for the purpose specified.

In testimony whereof I affix my signature in presence of two witnesses.

MARTIN BEITMILLER.

Witnesses:
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VICTOR KARMIN,
Engineer.