Oct. 27, 1953 H. C. HARTENBACH, JR 2,656,701

RUG SCOURING APPARATUS

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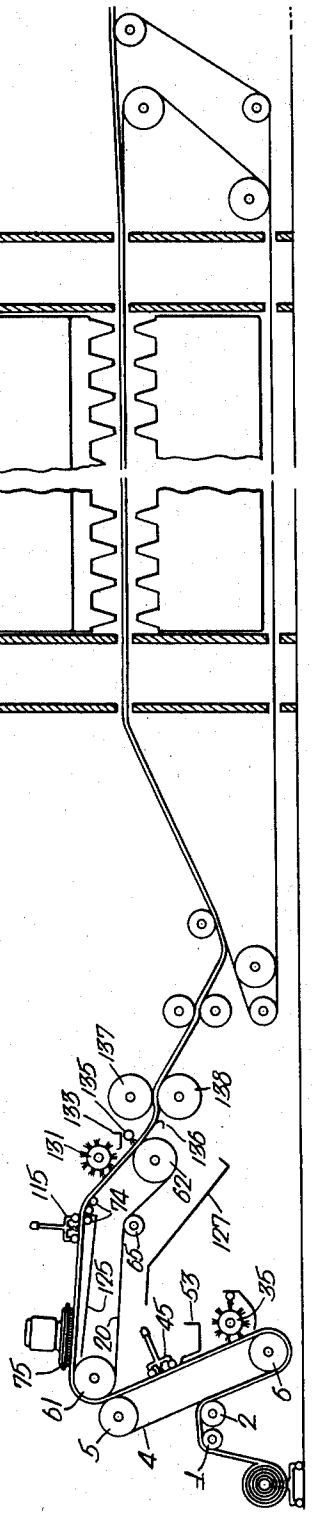


Fig. 1.

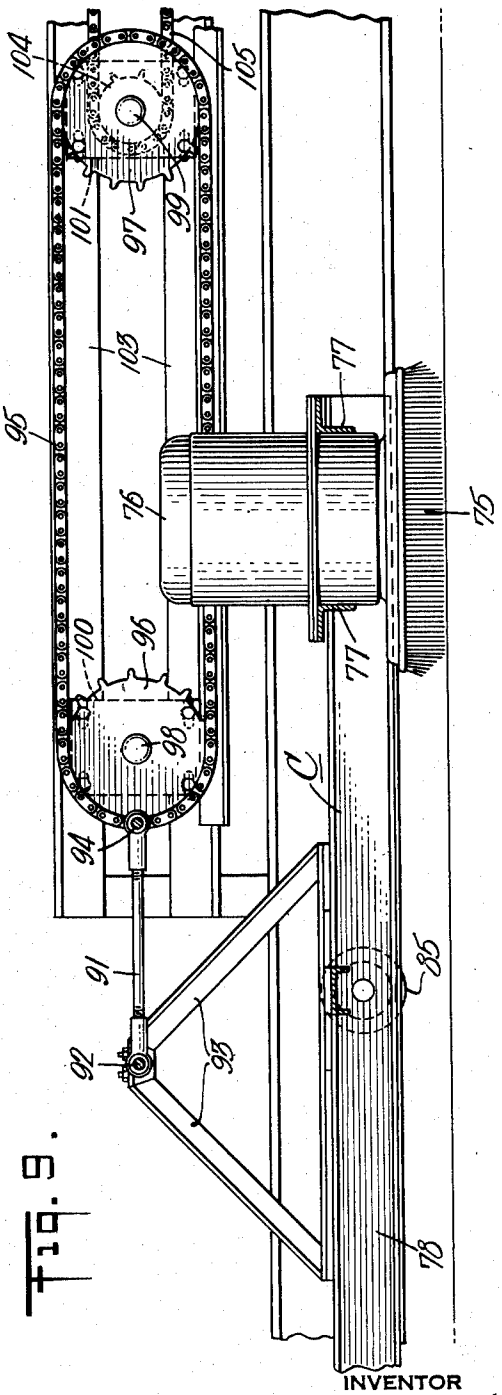


Fig. 9.

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RUG SCOURING APPARATUS

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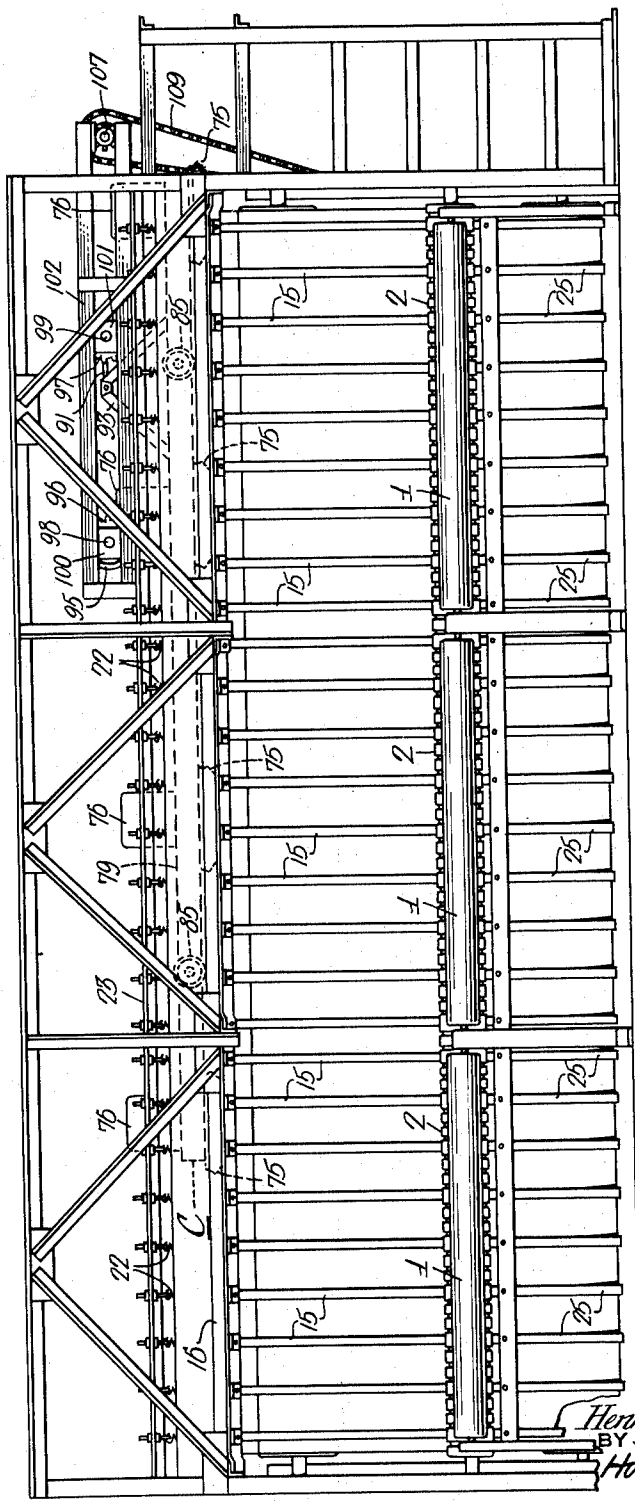


Fig. 2.

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RUG SCOURING APPARATUS

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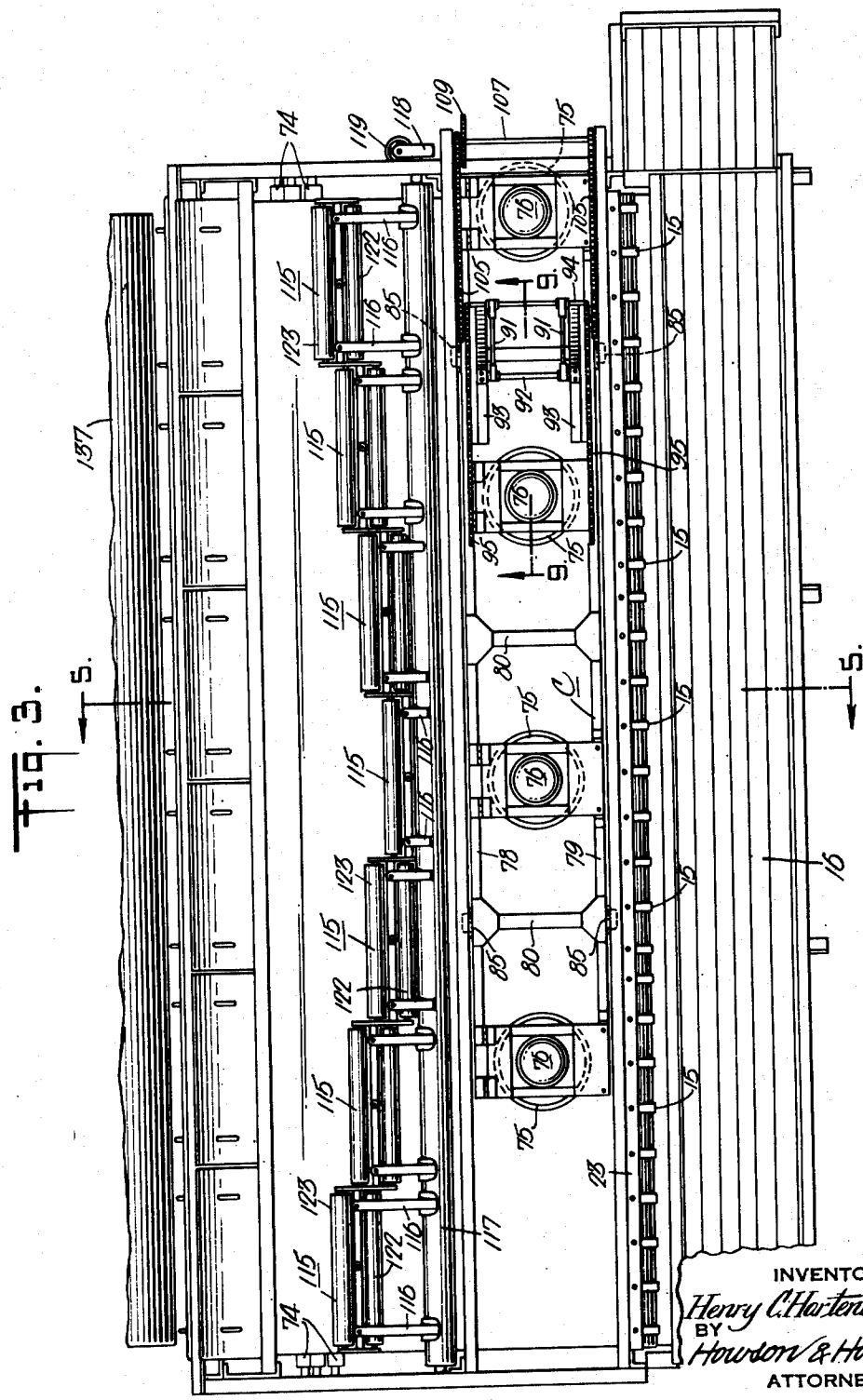


Fig. 3.

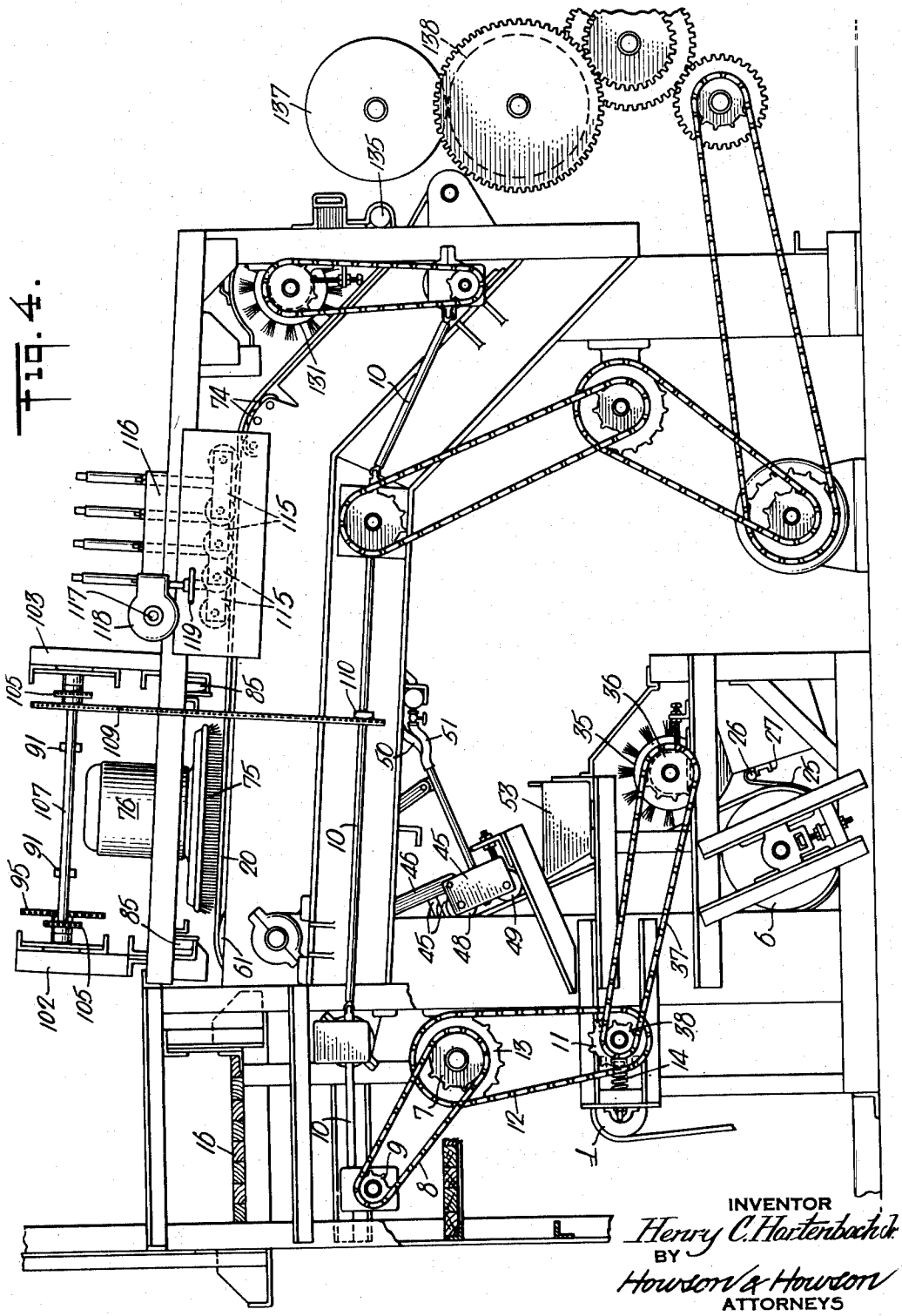
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Fig. 4.



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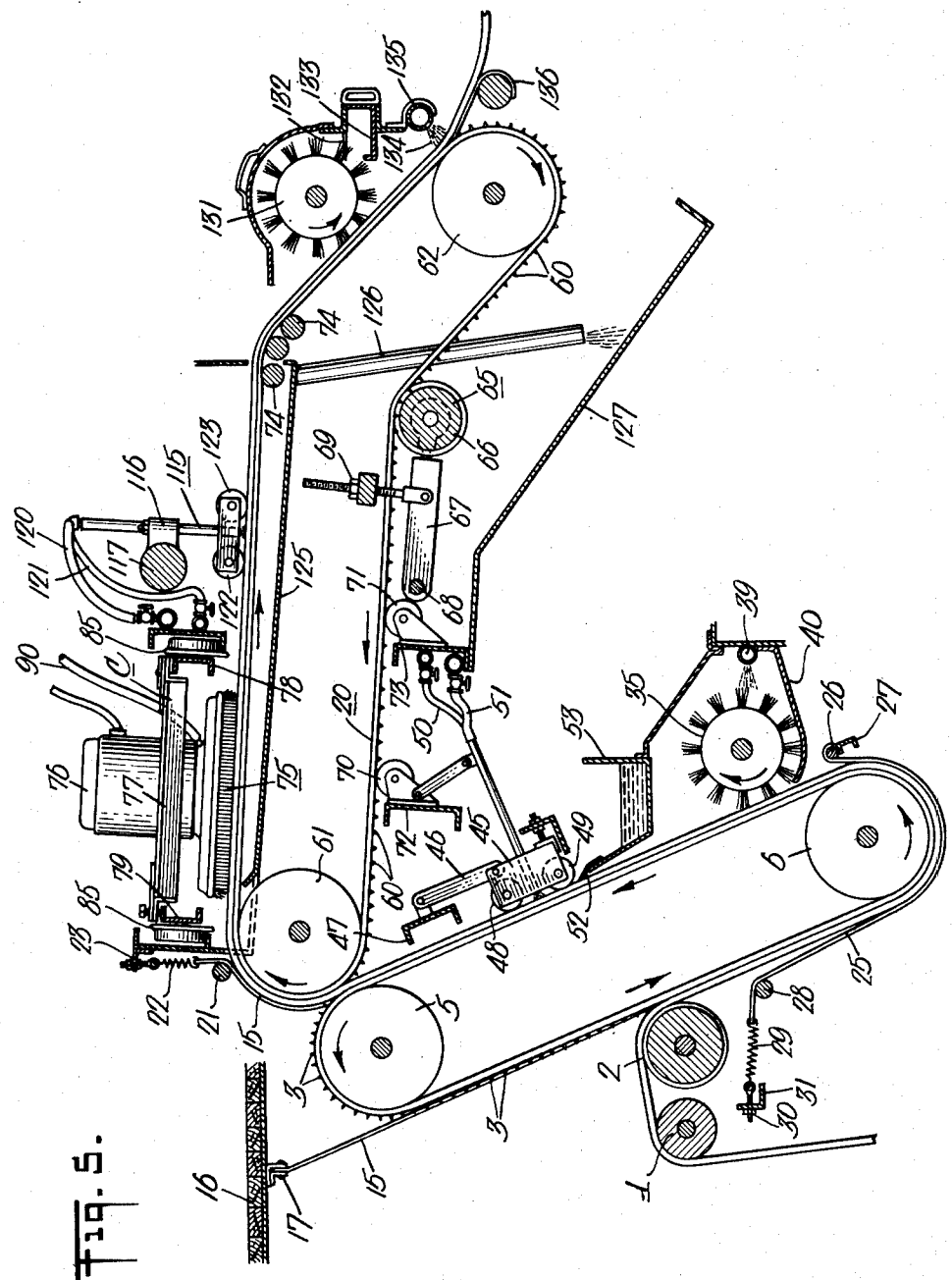


Fig. 5.

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RUG SCOURING APPARATUS

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Fig. 6.

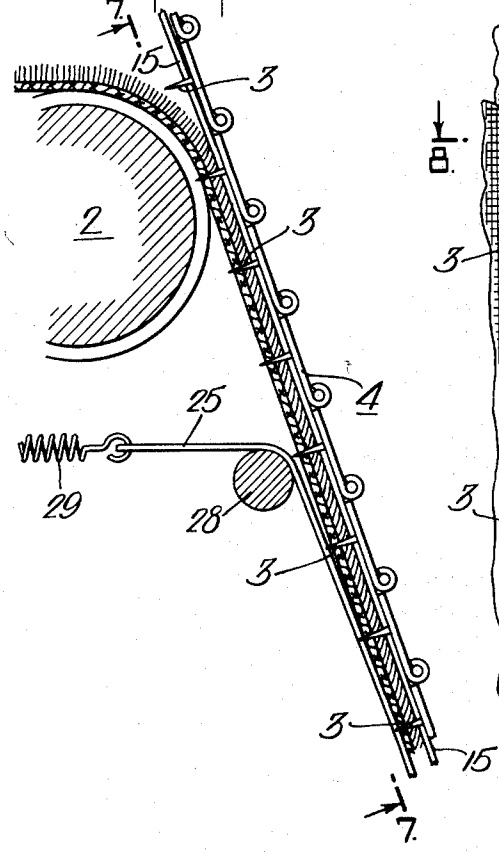


Fig. 7.

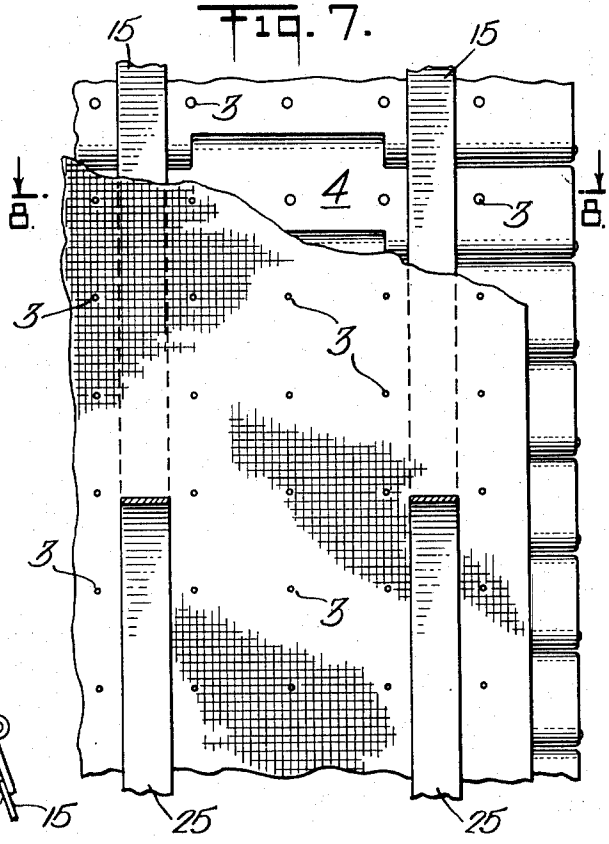
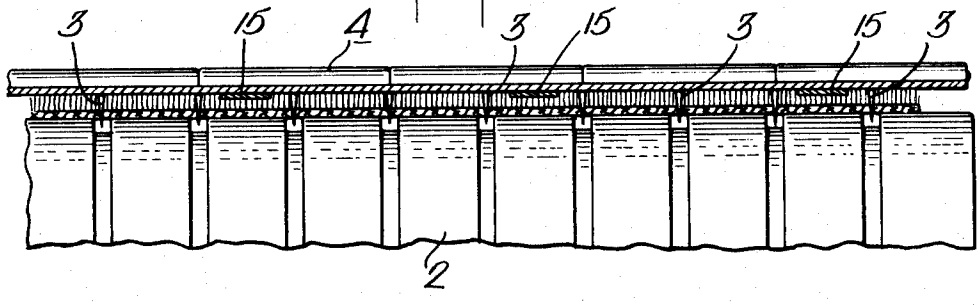


Fig. 8.



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2,656,701

RUG SCOURING APPARATUS

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Application May 25, 1949, Serial No. 95,241

7 Claims. (Cl. 68—39)

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This invention relates to new and useful improvements in scouring and scrubbing machines, particularly to new and useful improvements in apparatus for scouring and scrubbing rugs and like floor coverings.

Present day practice in substantially all rug cleaning establishments in the United States consists in first scouring and rinsing the pile side of the rug, scouring and rinsing the back of the rug, then squeegeeing or squeeze rolling the rug and finally drying it. In some very few cases the rugs are stretched during drying in order to maintain or return them to their original size, and an application of sizing to hold them to shape sometimes is made.

Most scouring and rinsing today is done by placing the rug on a cement floor and scouring the pile side thereof with a rotary floor cleaning brush while feeding a mixture of soap and water through the brush to the surface of the rug. After scouring, the surface of the rug is sprayed or rinsed by means of a clear water hose, and the rug is then turned over with the back side up and a similar scouring operation is performed on the back. If the establishment is a large one, they may have a large squeeze roll through which the rug is passed to remove excess water and for a thorough flushing to remove all traces of the cleansing soap, a large volume spray of clear water being directed on to the rug surface before it passes through a squeeze roll in order to provide as large a volume of rinse water as possible. If the establishment is small, the excess water and soap are merely scraped from the rug by means of a squeegee or analogous device.

After these operations have been completed, the rug is generally dragged manually into a drying room and mounted on a pole by one edge after which it is hoisted up so that it hangs in the room where it is subjected to circulating hot air or other drying medium.

Some of the major disadvantages of conventional rug cleaning practice, apart from the great amount of time and labor involved, consist in the non-uniformity of scouring and cleaning which results, the shrinkage of the rug because in most cases no attempt is made to control or prevent shrinkage, the migration and bleeding of the colors in the rug due to hanging them in a vertical position in the dry room, and the limpness and loss of shape due to loss of sizing during the scouring.

With the foregoing in mind, the principal object of the present invention is to provide a novel apparatus for scouring and cleaning rugs which

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effectively eliminates all of the foregoing disadvantages and objections encountered in present day practise and which in particular provides a uniform cleaning of the rug by mechanical means that substantially reduces the amount of time and labor required while maintaining positive control of the rug to prevent shrinkage thereof.

Another object of the invention is to provide an apparatus for scouring rugs having the features and advantages set forth, which is highly efficient and effective in operation and use.

These and other objects of the invention and the various features and details of the construction and operation thereof are hereinafter set forth and described with reference to the accompanying drawings in which:

Fig. 1 is a schematic side elevational view showing a rug scouring range embodying the scouring method and apparatus of the present invention in association with suitable drying apparatus;

Fig. 2 is an end elevational view of the apparatus from the feed end thereof;

Fig. 3 is a top plan view of the scouring apparatus shown in Fig. 2;

Fig. 4 is a side elevational view somewhat enlarged of the rug scouring apparatus;

Fig. 5 is a sectional view somewhat enlarged vertically through the scouring apparatus on line 5—5 of Fig. 3, the framework of the apparatus and the various drive connections to the several elements of the machine having been omitted for the purpose of clarity;

Fig. 6 is an enlarged fragmentary sectional view showing the manner in which the press-on roll operates to engage a rug to be cleaned with the spikes of the first conveyor of the apparatus;

Fig. 7 is a view taken on line 7—7, Fig. 6;

Fig. 8 is a fragmentary sectional view taken on line 8—8, Fig. 7; and

Fig. 9 is an enlarged fragmentary sectional view taken on line 9—9, Fig. 3, showing the carriage at the opposite end of the stroke from Fig. 3.

Referring now to the drawings and particularly Figs. 5 to 8 thereof, a rug or like article to be scoured is fed into the apparatus of the present invention over one or more idler rolls 1, and thence over a push-on roll 2 which operates to engage or impale the rug upon sharp pins or spikes 3 which are secured to and project outwardly from an endless conveyor 4. In accordance with the present invention the rug is fed to the machine so that the pile side thereof is in contact with the conveyor 4.

As best shown in Figs. 6, 7 and 8, the conveyor 4 preferably is of the perforated plate hinge type, and the pins 3 are arranged therein, for example, on three-inch centers both in the direction of travel of the conveyor and transversely thereof. The conveyor 4 is mounted upon a pair of sprockets 5 and 6 respectively, the upper one 5 of which is driven at a predetermined rate of speed from a sprocket 7 (see Fig. 4). The sprocket 7 is driven by chain 8 from a smaller sprocket 9 which in turn is driven by a sectional main power shaft 10 in the machine, said shaft being driven by a suitable series of chains and sprockets from the main power source of the machine. The push-on roll 2 is driven by a sprocket 11 from a chain 12 which in turn is driven by sprocket 13 secured on the same shaft as the aforesaid sprocket 7. In addition, the push-on roll 2 is biased or urged by a spring 14 in the direction of the rug.

Outwardly overlying the conveyor 4 and extending in the direction of travel thereof is a plurality of strips or bands 15, for example of stainless steel or other suitable material. A plurality of these bands or strips 15 is provided across the machine at equally spaced intervals, and they are anchored at one end to the underside of the work platform 16 of the machine, as indicated at 17, from which point they extend downwardly over the initial or rug-receiving course of the conveyor 4, about the lower end thereof and thence upwardly along the inner course of the conveyor. The other ends of the strips 15 extend partially about the adjacent end of second endless conveyor 20, under a transverse rod or bar 21 and are anchored through a spring 22 to a fixed part 23 of the frame of the machine.

By virtue of this construction and arrangement of the conveyor 4 and strips or bands 15, it will be apparent that when the rug to be cleaned is impaled on the projecting pins or spikes 3 of the conveyor by the push-on roll 2, the said strips or bands 15 will be disposed between the rug and the conveyor 4 in the relation, for example, shown in Fig. 6 of the drawings. In order to retain the rug upon the pins of spikes 3 of the conveyor 4, as the latter travels around its lower sprocket 6, there is provided outwardly adjacent the rug a series of strips or bands 25 spaced at intervals transversely of the apparatus. At their inner ends these strips or bands 25 are secured to a rod or bar 26 which is mounted to a fixed part 27 of the machine, and at their other end the said strips or bands 25 are flexed over a fixed bar or rod 28 and connected through springs 29 to an adjustable connection 30 with a fixed part 31 of the machine.

As the rug is impaled upon the pins or spikes 3 of the conveyor 4 by means of the push-on roll 2, the rug is carried by the conveyor 4 in a downward direction about the bottom sprocket 6 and thence in an upward course or direction, as indicated by the arrows. As previously stated, the rug is engaged with the conveyor 4 with the pile side in contact with the conveyor and hence as the rug commences its upward course on the conveyor, the back side of the rug is facing outwardly or away from the conveyor.

At this point in the course of travel of the rug the back side thereof is thoroughly cleaned and scrubbed by means of a back cleaning brush 35 which rotates in the direction of the arrow. This brush 35 preferably is of the horizontal cylinder type and, as shown in Fig. 4, may be driven

by a pulley 36 from a chain 37 which is driven in turn by a sprocket 38 secured on the same shaft as the push-on roll sprocket 11. The back cleaning brush 35 is provided with an ample supply of a mixture of water and a cleaning agent such as soap from suitable spray devices 39. Underlying the brush 35 is a plate 40 which serves as a reservoir for the water and cleaning mixture discharged from the spray 39 so that as much of this mixture as possible is applied to the back surface of the rug by the action of the brush 35.

As upward travel of the rug continues, the back side thereof is next brought into engagement with suitable rinsing devices 45 which are suspended by links 46 from a fixed part 47 of the machine. These rinse devices 45 each comprises a pair of relatively spaced rolls 48 and 49 which are adapted to ride upon the back surface of the upwardly moving rug, and clear rinse water and air under pressure are supplied by means of suitable flexible hoses 50 and 51 respectively and discharged against the back side of the rug intermediate the rolls 48 and 49. In addition to providing support for the rinse device 45 in respect to the back surface of the rug, these rolls 48 and 49 operate to entrap therebetween a turbulent mass of compressed air and water which effects a thorough rinsing of the soap or other cleaning agent from the rug, the aeration of the water by the air discharged under pressure providing an effervescence or turbulence which has been found distinctly advantageous in effecting a thorough and complete rinsing of the rug. The used rinse water and the soap rinsed from the rug are directed by means of a resilient doctor blade 52 into a trough or the like 53 to which a suitable drain may be connected for carrying off the used rinse water.

Upward travel of the rug continues as aforesaid until it reaches the upper sprocket 5 at which time the underlying strips or bands 15 function to strip the rug from the pins or spikes 3 of the first conveyor 4 and to transfer the rug therefrom to the second conveyor 20 by engaging or impaling the rug upon similar pins or spikes 60 provided on the said second conveyor 20.

The second conveyor 20 extends about two main sprockets 61 and 62 respectively which are arranged so that the conveyor 20 is disposed generally horizontal with a dog-leg or declining portion at its outer or discharge end. The sprocket 61 of the second conveyor 20 is disposed parallel to and adjacent the upper sprocket 5 of the first conveyor 4, and these two sprockets 5 and 61 are mounted so that they are about 10° to 12° off true tangency with respect to each other in order to facilitate transfer of the rug from the conveyor 4 to the conveyor 20.

The conveyor 20 travels in the direction indicated by the arrows in Fig. 5, and in its lower course is supported at the bend by means of a roll 65 having grooves 66 to provide clearance for the passage of the pins or spikes 60. This roll 65 is carried by the outer end of an arm 67 which is pivoted to a stationary part 68 of the machine and is adjustable relative to the machine by means of an adjustment 69. In addition, the lower course of the conveyor 20 is supported at suitable intervals by small rolls 70 and 71 respectively supported from fixed parts 72 and 73 of the frame structure of the machine. At the bend in the upper course, the conveyor is supported by a series of small rolls 74.

After transfer of the rug to the second con-

veyor 20 in the manner previously described, the rug is conveyed upwardly and over the sprocket 61 and starts to move through the general horizontal portion of the upper course of said conveyor. During travel of the rug through this horizontal portion of the conveyor upper course, it will be apparent that the pile side of the rug is facing upwardly and exposed for cleaning.

In the initial portion of its travel through the upper course of the conveyor 20, the upwardly facing pile side of the rug is thoroughly scrubbed and scoured by means of a plurality of rotary brushes 75, each driven by a suitable source of power such as an electric motor 76. In the illustrated embodement of the invention four such brushes 75 are provided and these are carried in suitable brackets 77 which form part of a generally rectangular frame or carriage C comprising side rails 78, 79 and connecting members 80 constructed and arranged so that the brackets 77 span the space between the said rails 78 and 79 and the brushes 75 are disposed intermediate the latter, for example, as shown in Figs. 3 and 5 of the drawings.

The brush carriage C is adapted to be moved back and forth transversely of the apparatus and crosswise of the pile side of the rug so that the rotating brushes 75 are caused to contact or engage the entire width of the rug. For this purpose the side members 78 and 79 of the carriage mount wheels or the like 85 which are adapted to ride upon the lower flanges of a pair of inwardly facing channel frame members which are fixedly secured transversely of the apparatus, for example, as best shown in Fig. 5 of the drawings.

A mixture of water and cleaning agent such as soap is supplied to each of the rotary brushes 75 through a hose or the like 90. The forward motion of the rug on the conveyor 20 and the crosswise movement of the rotary brushes 75 produces a definite path of scouring upon the rug which is controllable and is automatically maintained by driving the rotating brush carriage back and forth in timed relation to the travel of the rug through the machine. The rotary brushes 75 may be floatingly mounted in the frames 77 so that they automatically adjust themselves to the various thicknesses of rugs that may be conveyed through the machine.

With reference to Figs. 3, 4 and 9 of the drawings, the rotary brush carriage C is actuated back and forth across the rug in the manner described by means of a pair of arms 91 which are pivotally connected at one end upon a fixed rod 92 that is connected between a pair of standards 93 provided at opposite sides of the carriage. The other ends of the arms 91 are pivotally mounted upon a crossbar 94 which has its opposite ends fixedly connected to a pair of endless chains 95 for movement therewith. The chains 95 are carried by suitable sprockets 96 and 97 which in turn are fixed upon stub shafts 98 and 99 mounted in suitable bearings 100, 101 secured to and supported by relatively spaced portions 102 and 103 (see Fig. 4) of the structural framework of the machine. Also mounted on the stub shafts 99 are smaller sprockets 104 which are driven by a pair of chains 105 from suitable sprockets that are fixed on a shaft 107. This shaft 107 also has fixed thereon a relatively larger sprocket, and this sprocket is driven by a chain 109 from a suitable sprocket 110 that is secured upon the main drive shaft 10 of the machine.

After the rug has been subjected to the described scrubbing and scouring action of the rotary brushes 75, continued movement of the conveyor 20 brings the rug into engagement with a plurality of rinsing devices 115. These rinsing devices 115 are constructed and operate substantially as described with reference to the rinsing devices 45. However, in the present instance the rinse devices 115 are supported in arms 116 which project forwardly from a bar or rod 117 that overlies the rug and extends across the machine.

It is to be noted that the arms 116 for the different rinse devices 115 are of greater length laterally outward from the center of the machine so that the several rinse devices 115 at the opposite sides of the center are spaced forwardly or outwardly from the bar 117 a progressively greater distance in staggered or stepped relation laterally outward from the center of the machine in the manner and relationship shown in Fig. 3 of the drawings.

The bar or rod 117 is rotatably supported, and a worm and wheel arrangement is provided in a housing 118 at one side of the apparatus and arranged to be operated by a hand wheel 119 for rotationally adjusting the bar or rod 117 and thereby regulating the rinse devices 115 with respect to the pile side of the rug.

As in the case of the rinse devices 45, water and air under pressure are supplied thereto by means of suitable flexible hoses 120 and 121, respectively, and this mixture of air under pressure and water is discharged against the pile side of the rug where it is partially confined or entrapped between pairs of rolls 122 and 123 as aforesaid so that a thorough rinsing of the soap or other cleaning agent from the rug is effected in the manner previously described. The soap and water from the rotary brushes 75 and the used rinse water discharged from the rinse devices 115 collects in a tray 125 provided beneath the upper course of the conveyor 20, and the water which collects in the tray 125 in turn is discharged through a pipe 126 to a lower tray or trough 127 from which it is conducted by suitable means to a drain or the like (not shown).

After passing beneath the rinse devices 115 the rug and upper course of the conveyor 20 passes over the series of small rolls 74 and then takes a downward course to bring the pile side of the rug into engagement with a pile-laying brush 131 which is rotationally driven in the direction indicated by the arrow in Fig. 5. The pile-laying brush 131 is of the horizontal cylinder type and functions to lay the pile of the rug in one direction in order to ensure a good appearance to the rug after it has been squeezed and dried. Associated with the pile-laying brush 131 is a comb 132 which is adapted to remove from the bristles of the brush 131 such pieces of yarn, fibre and the like as the brush may pick up from the rug. As these pieces are disengaged from the brush by the comb 132 they are collected in a suitable tray or the like 133.

After the pile is laid by the brush 131, the rug is finally rinsed by subjecting it to heavy uniform sprays of water 134 which are discharged, for example, from a plurality of openings provided in a pipe or the like 135. The rug is then stripped from the conveyor 20 by means of a plurality of fingers or strips 136 and is passed between a pair of squeeze rolls 137 and 138 respectively, after which it may be sized and dried in any suitable manner, for example, in the man-

ner and in a drier of the type disclosed in my Patent No. 2,265,071 issued December 2, 1941.

From the foregoing description it will be observed that the present invention provides a novel apparatus for scouring and cleaning rugs which eliminates effectively the numerous disadvantages and objections encountered in present day rug cleaning practises. The invention particularly provides a novel apparatus for effecting a uniform cleaning of rugs by mechanical means which substantially reduces the time and labor required and at the same time maintains positive control of the rug to prevent shrinkage thereof.

In addition, the present invention provides a novel rug scouring apparatus which when employed in conjunction with the drying method and apparatus of my aforesaid Patent No. 2,265,071 enables rugs to be efficiently scoured, cleaned, sized and dried in a continuous process during which the rugs are positively held in a definite position and are entirely free of any manual handling of the rugs between the free end of the scouring machine and the delivery end of the drier.

While particular embodiments of the method and apparatus of the present invention have been set forth herein, it is not intended to limit the invention to such disclosures, and changes and modifications may be made and incorporated therein as desired within the scope of the following claims.

I claim:

1. In rug scouring apparatus, a first endless conveyor having projecting pins arranged at intervals longitudinally and transversely thereof, mechanism to feed and direct a rug progressively into impaled engagement upon the pins of said conveyor in one course thereof to be carried by the conveyor with one side of the rug facing outwardly, a second endless conveyor having one end thereof disposed adjacent to said first conveyor at the end of the other course thereof and provided with projecting pins arranged longitudinally and transversely thereof, elements disposed to underlie a rug on the first conveyor and extending longitudinally thereof to and about the adjacent end of said second conveyor operable to strip a rug from the pins of said first conveyor and direct the same progressively into impaled engagement upon the pins of the second conveyor to be carried thereby with the other side of the rug facing outwardly, scrubbing means adjacent said other course of the first conveyor operable to engage and thoroughly clean said one side of the rug thereon, rinse means adjacent said scrubbing means, scrubbing means adjacent the second conveyor comprising a plurality of rotary brushes reciprocable transversely as a unit across said other surface of the rug to thoroughly clean the same, and rinse means adjacent said second scrubbing means.

2. In rug scouring apparatus, a first endless conveyor having projecting pins arranged at intervals longitudinally and transversely thereof, mechanism to feed and direct a rug progressively into impaled engagement upon the pins of said conveyor in one course thereof to be carried by the conveyor with one side of the rug facing outwardly, a second endless conveyor having one end thereof disposed adjacent to said first conveyor at the end of the other course thereof and provided with projecting pins arranged longitudinally and transversely thereof, elements disposed to underlie a rug on the first conveyor and extending longitudinally thereof to and about the adjacent end of said second conveyor operable to strip a rug from the pins of said first conveyor and direct the same progressively into impaled engagement upon the pins of the second conveyor to be carried thereby with the other side of the rug facing outwardly, scrubbing means adjacent said other course of the first conveyor operable to engage and thoroughly clean said one side of the rub thereon, rinse means adjacent said scrubbing means, scrubbing means adjacent the second conveyor comprising a plurality of rotary brushes reciprocable transversely as a unit across said other surface of the rug to thoroughly clean the same, mechanism to actuate said brushes crosswise of the rug in timed relation to the travel thereof on said second conveyor, and rinse means adjacent said second scrubbing means.

3. In rug scouring apparatus, a first endless conveyor having projecting pins arranged at intervals longitudinally and transversely thereof, mechanism to feed and direct a rug progressively into impaled engagement upon the pins of said conveyor in one course thereof to be carried by the conveyor with one side of the rug facing outwardly, a second endless conveyor having one end thereof disposed adjacent to said first conveyor at the end of the other course thereof and proided with projecting pins arranged longitudinally and transversely thereof, means to strip a rug from the pins of the first conveyor and direct the same progressively into impaled engagement upon the pins of the second conveyor to be carried thereby with the other side of the rug facing outwardly, scrubbing means adjacent said other course of the first conveyor operable to engage and thoroughly clean said one side of the rug thereon, rinse means adjacent said scrubbing means, scrubbing means adjacent the second conveyor operable to thoroughly clean said other side of the rug, rinse means adjacent said second scrubbing means, pile laying means adjacent the second conveyor disposed to engage the rug thereon and lay the same in one direction, and means associated with the other end of said second conveyor operable to strip the rug from the pins thereof.

4. In rug scouring apparatus, a first endless conveyor having projecting pins arranged at intervals longitudinally and transversely thereof, mechanism to feed and direct a rug progressively into impaled engagement upon the pins of said conveyor in one course thereof to be carried by the conveyor with one side of the rug facing outwardly, a second endless conveyor having one end thereof disposed adjacent to said first conveyor at the end of the other course thereof and provided with projecting pins arranged longitudinally and transversely thereof, means to strip a rug from the pins of the first conveyor and direct the same progressively into impaled engagement upon the pins of the second conveyor to be carried thereby with the other side of the rug facing outwardly, elements arranged to outwardly overlie a rug on the first conveyor to maintain the rug thereon, scrubbing means adjacent said other course of the first conveyor operable to engage and thoroughly clean said one side of the rug thereon, rinse means adjacent said scrubbing means, scrubbing means adjacent the second conveyor comprising a plurality of rotary brushes reciprocable transversely as a unit across said other surface of the rug to thoroughly clean the same, mechanism to actu-

ate said brushes crosswise of the rug in timed relation to the travel thereof on said second conveyor, rinse means adjacent said second scrubbing means, pile laying means comprising a brush adjacent the second conveyor and disposed to engage the rug and lay the pile in one direction, and means associated with the other end of said second conveyor operable to strip the rug from the pins thereof.

5. In rug scouring apparatus, an endless conveyor provided with projecting pins arranged longitudinally and transversely thereof to carry a rug, means to feed and direct a rug progressively into impaled engagement upon said pins of the conveyor in one course thereof, a series of independently driven rotary scrubbing means adjacent said one course of the conveyor reciprocable as a unit transversely across the surface of the rug to thoroughly clean the same, and mechanism to actuate said rotary scrubbing means as a unit crosswise of the rug in timed relation to the travel thereof on said conveyor.

6. In rug scouring apparatus, an endless conveyor provided with projecting pins arranged longitudinally and transversely thereof to engage and carry a rug, means to feed and direct a rug progressively into impaled engagement upon said pins of the conveyor in one course thereof, scrubbing means adjacent said one course of the conveyor comprising a plurality of independently driven rotary brushes reciprocable transversely as a unit across the surface of the rug to thoroughly clean the same, rinse means adjacent said scrubbing means, pile laying means comprising a brush adjacent the conveyor and disposed to engage the rug thereon and lay the pile in one direction, and means associated with said conveyor cooperable therewith to strip the rug from the pins thereof.

7. In rug scouring apparatus, an endless conveyor having projecting pins arranged at intervals longitudinally and transversely thereof, mechanism to feed and direct a rug progressively into impaled engagement upon the pins of said conveyor in one course thereof to be carried by the conveyor with one side of the rug facing outwardly, elements arranged to outwardly overlie a rug on the conveyor to maintain the rug thereon during travel thereof from said one course to the other course of the conveyor, scrubbing means adjacent the other course of the conveyor operable to engage and thoroughly clean said one side of the rug thereon, rinse means adjacent said scrubbing means, and means to strip the rug from said conveyor.

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