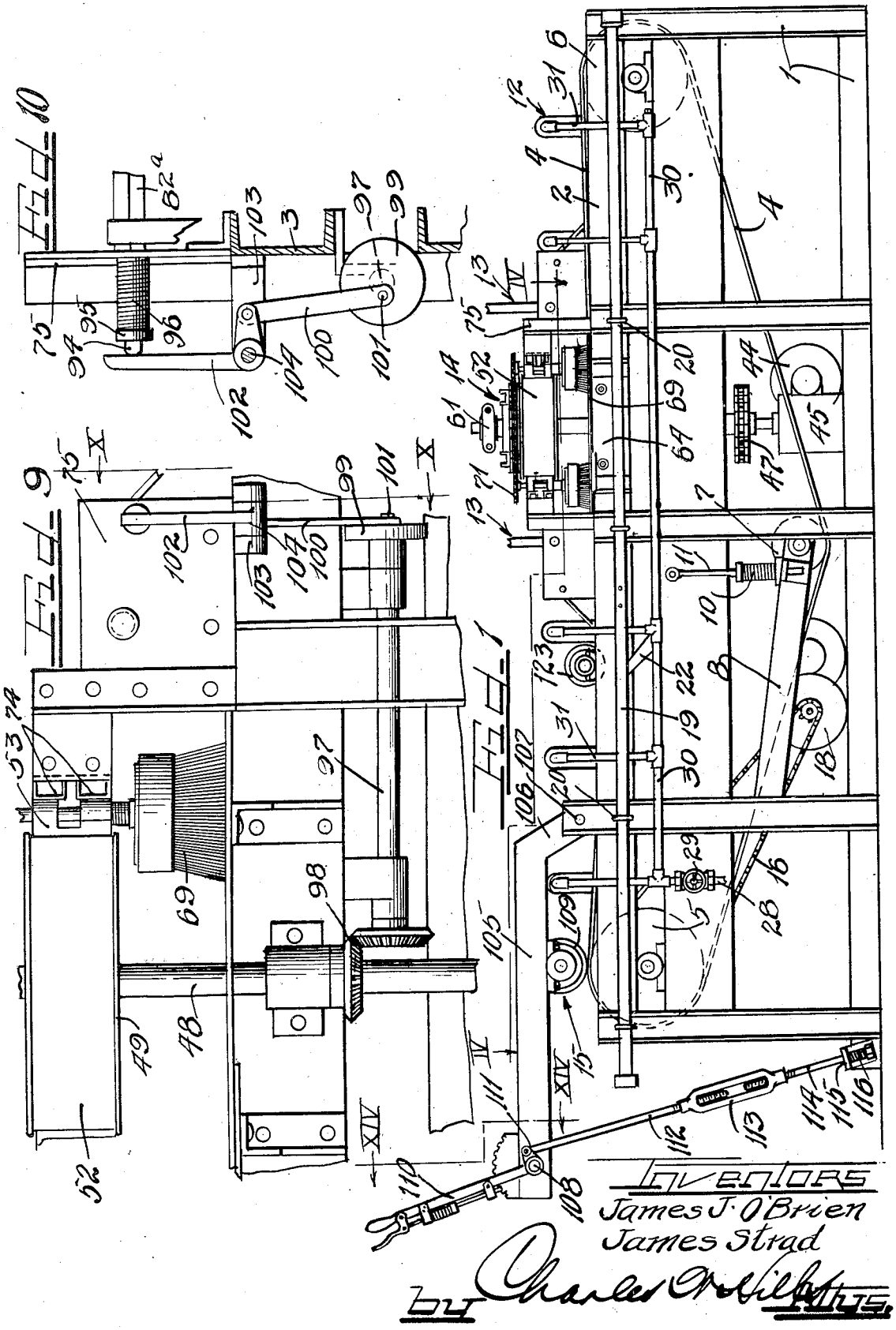
Feb. 9, 1943. J. J. O'BRIEN ET AL 2,310,541

CLEANING MACHINE

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CLEANING MACHINE

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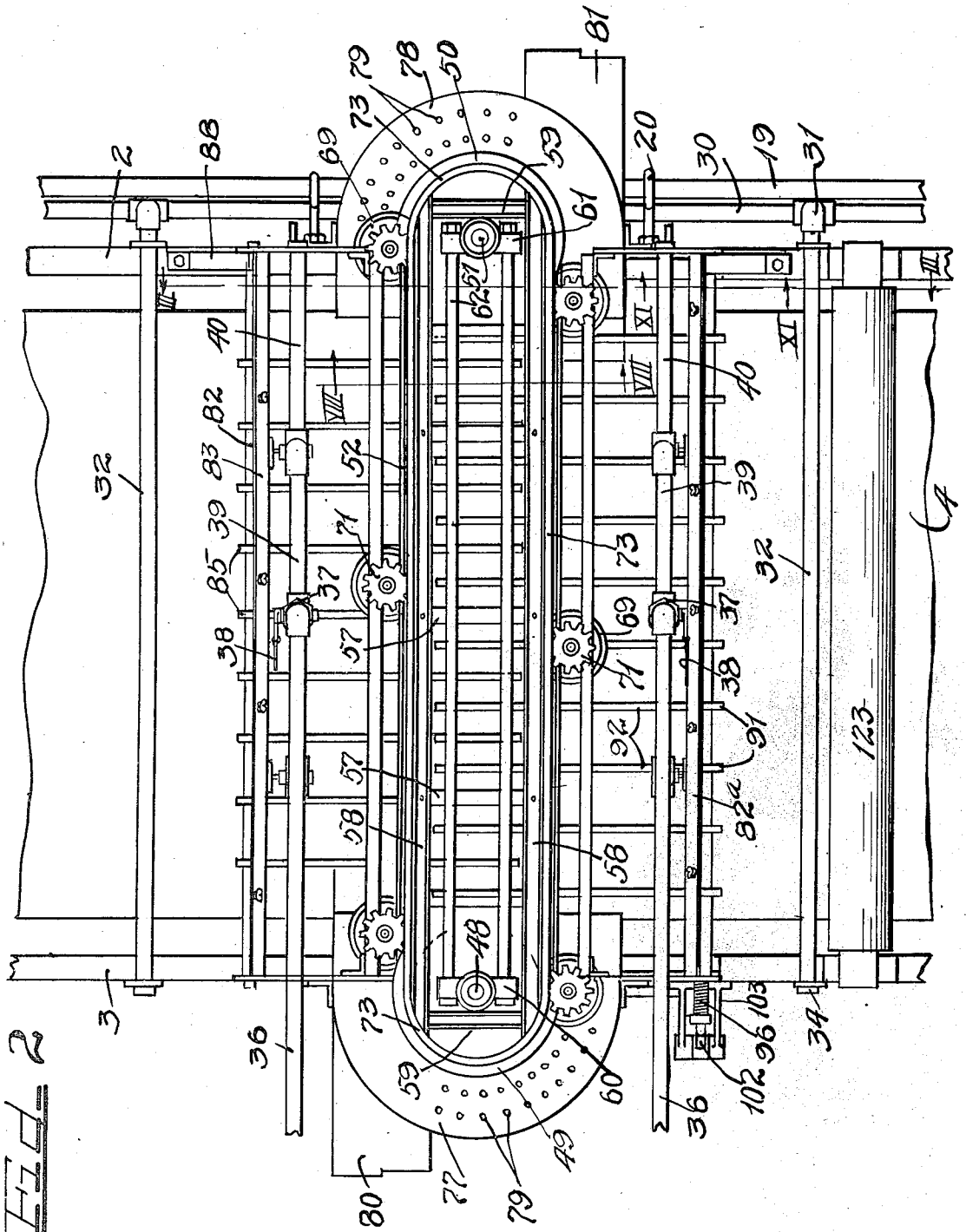


FIG. 2

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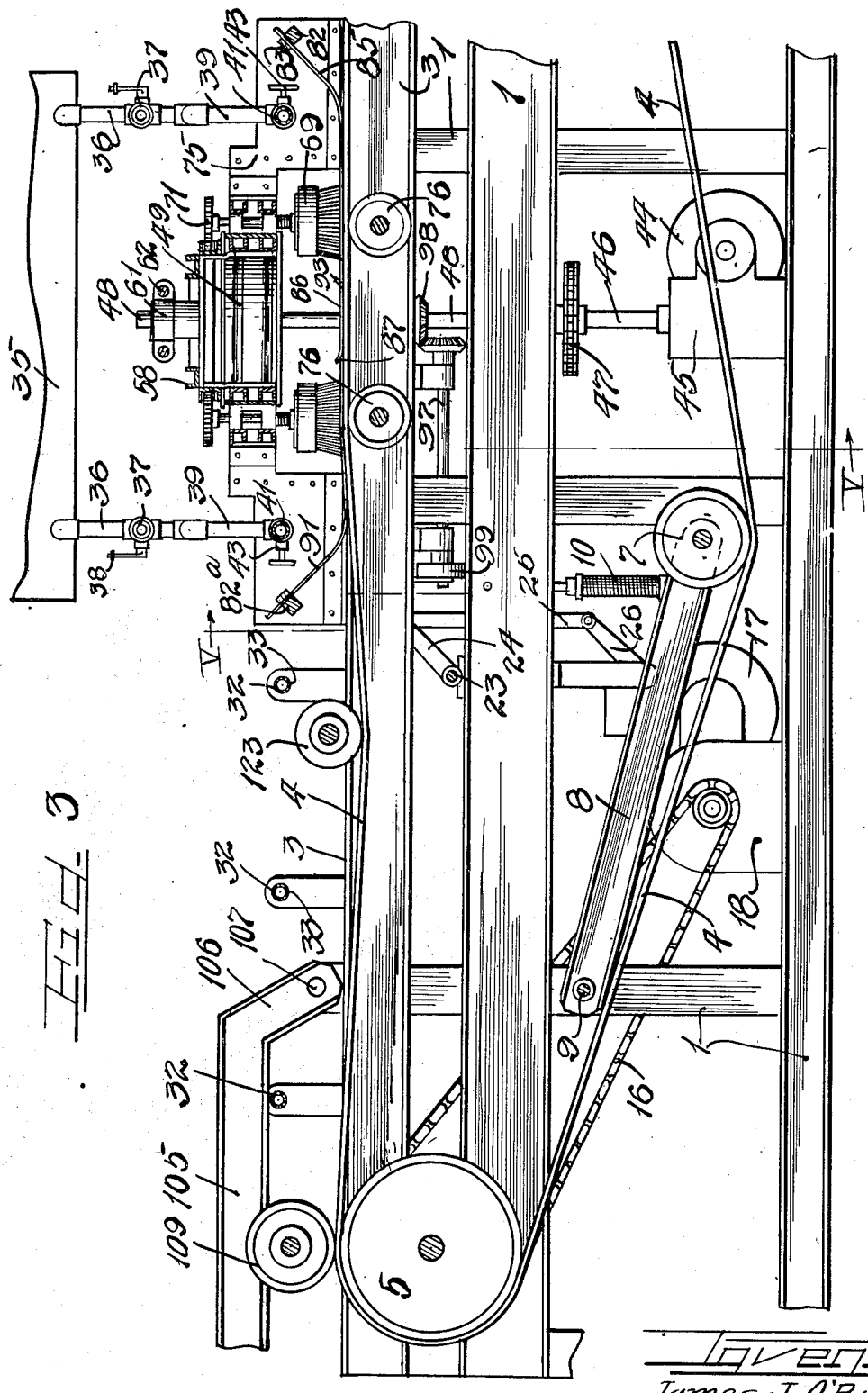


FIG. 3

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CLEANING MACHINE

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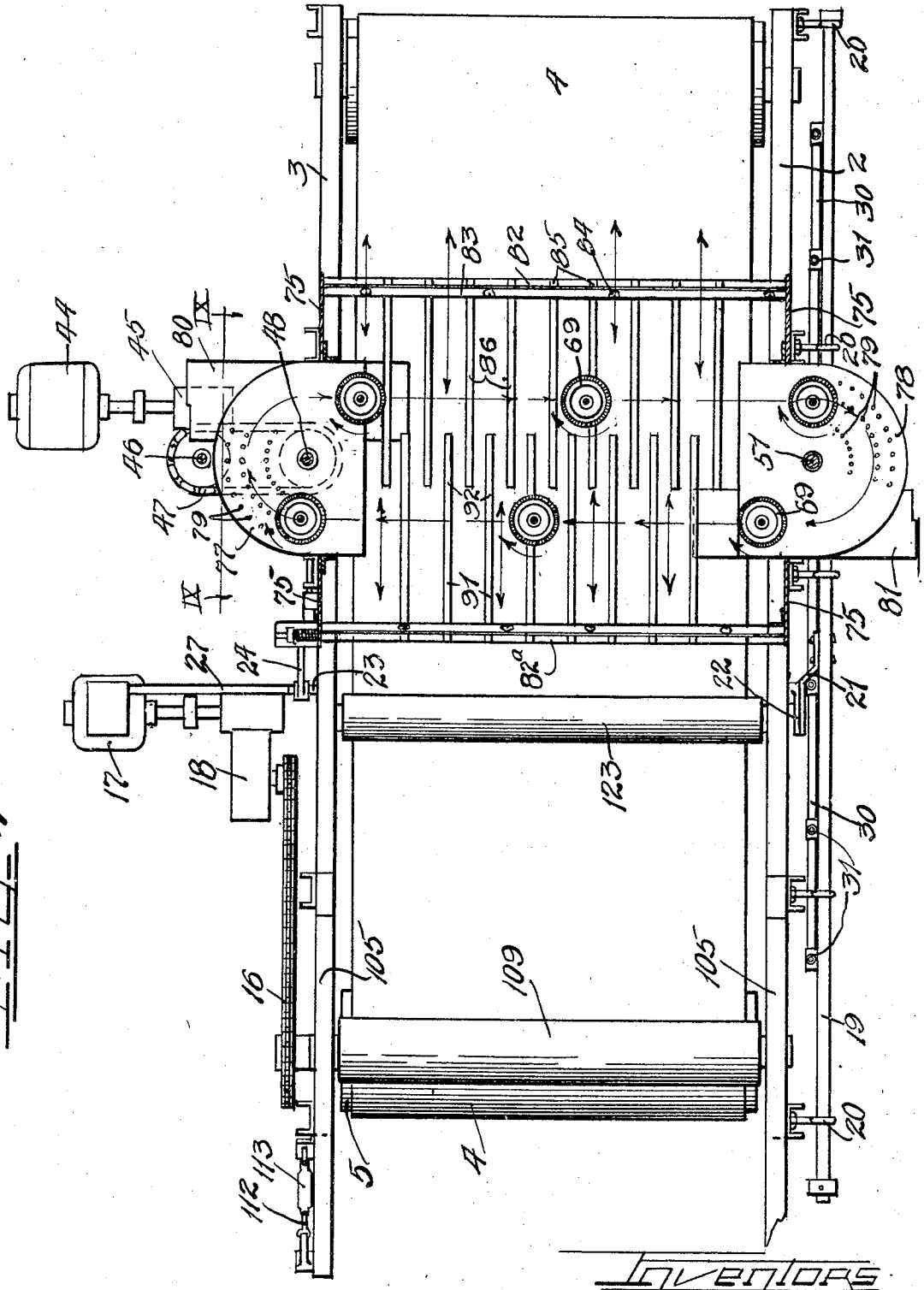


Fig. 4

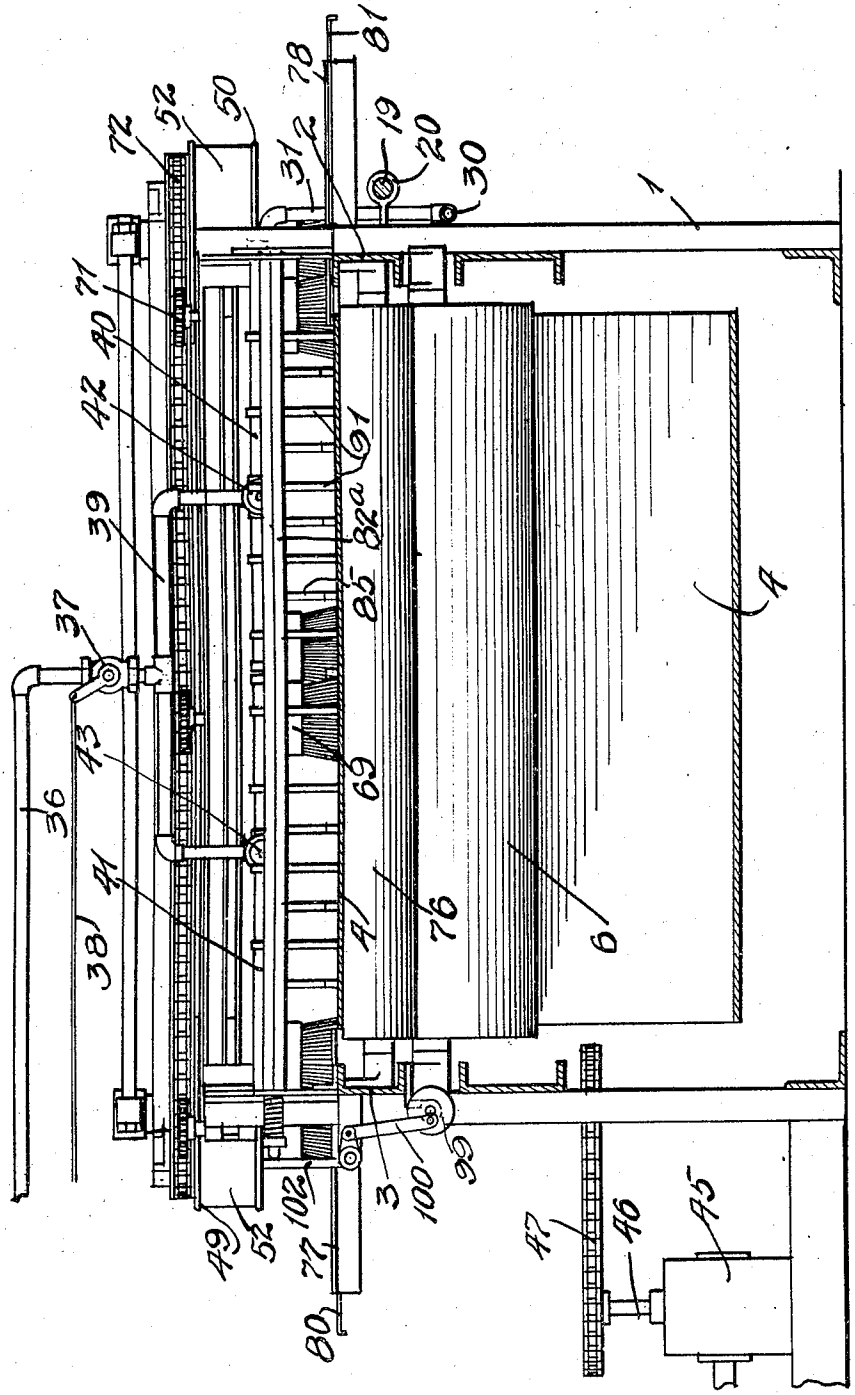
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CLEANING MACHINE

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FIG 5



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CLEANING MACHINE

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Fig. 6

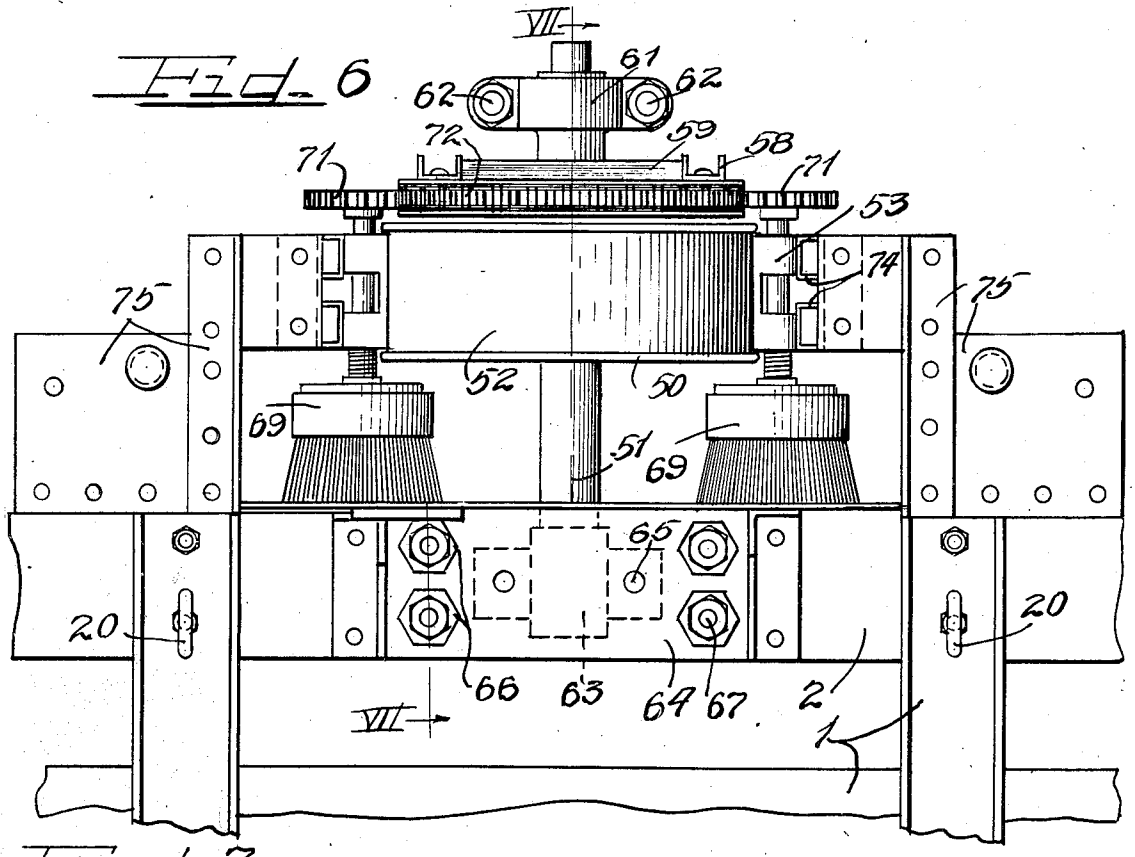


Fig. 7

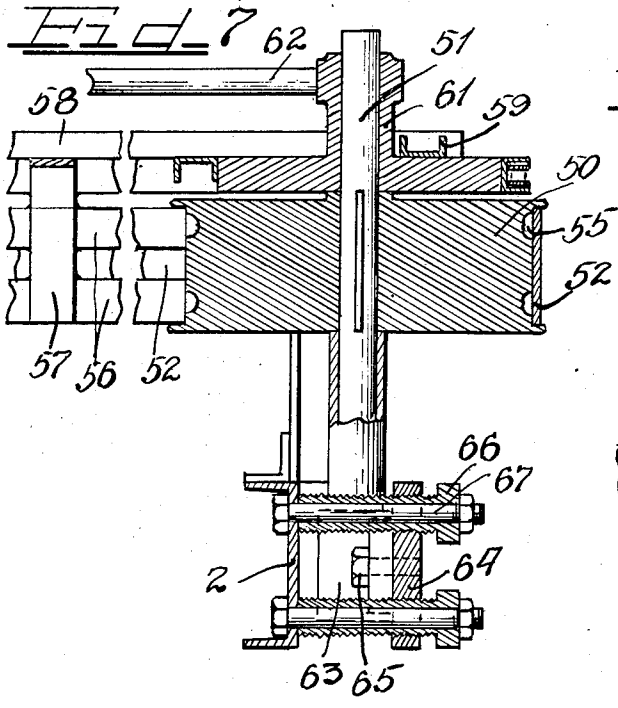
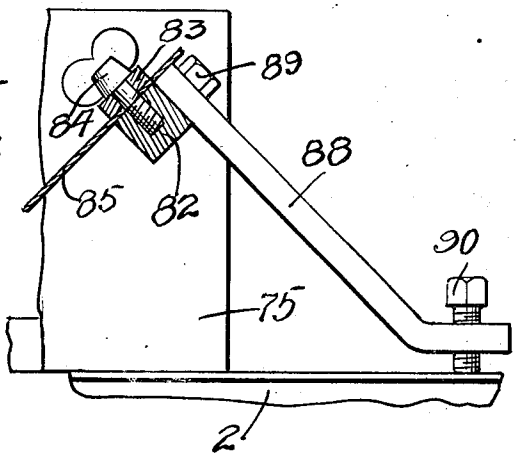


Fig. 11



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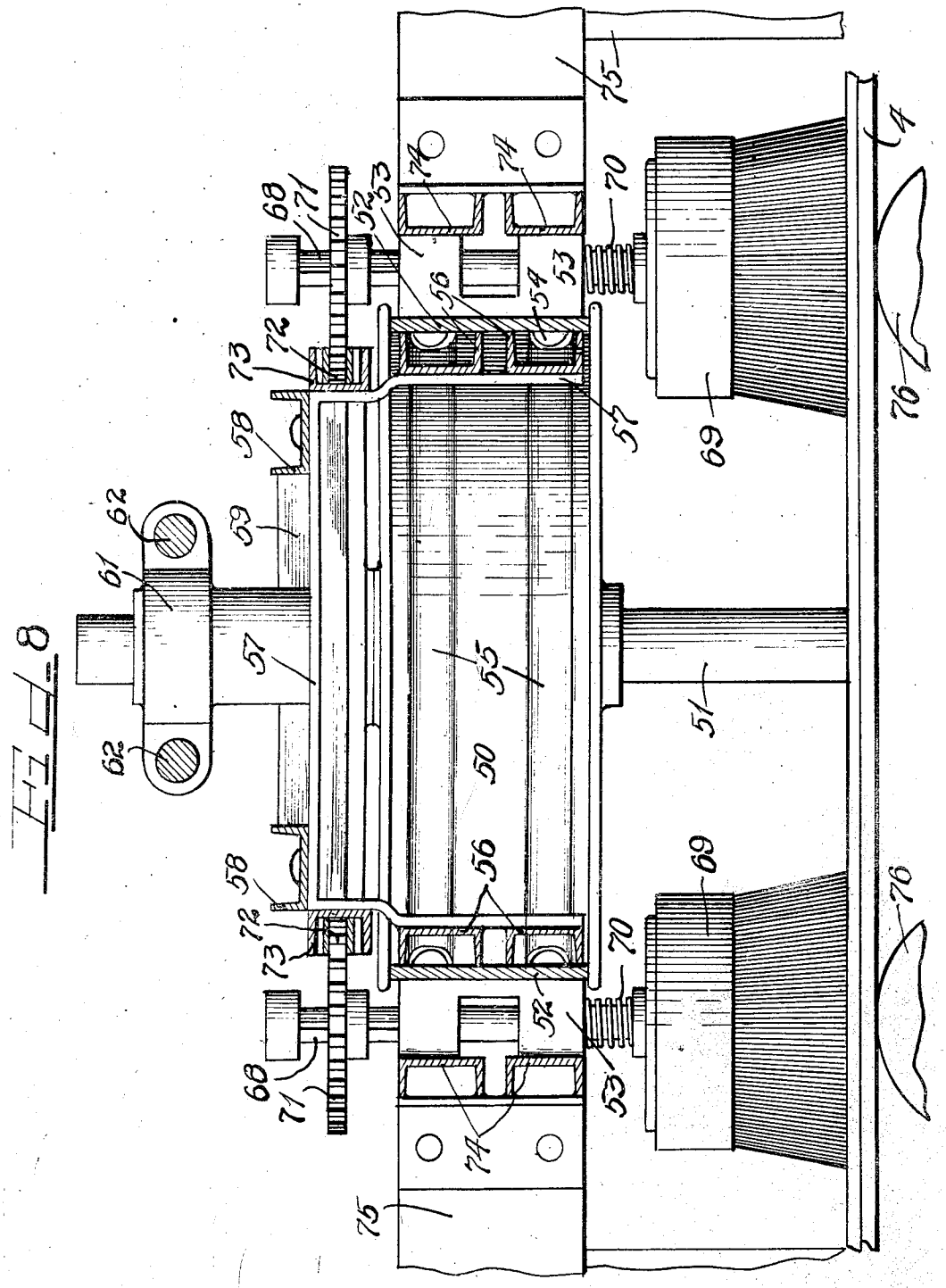


FIG. 8

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CLEANING MACHINE

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Fig. 13

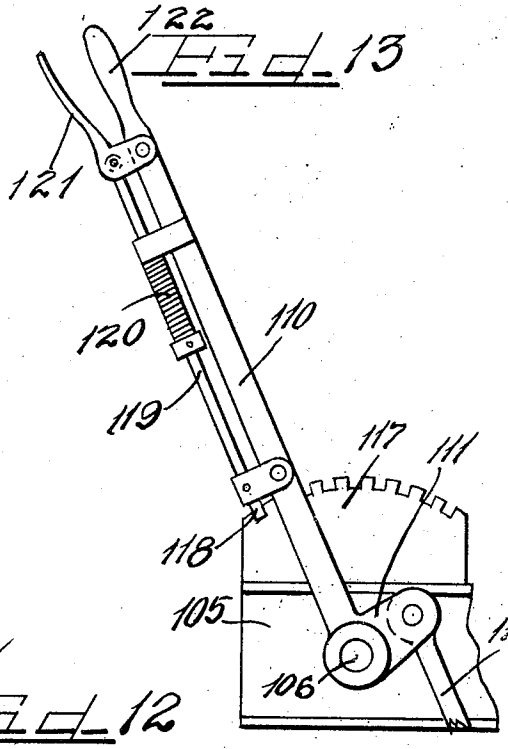


Fig. 14

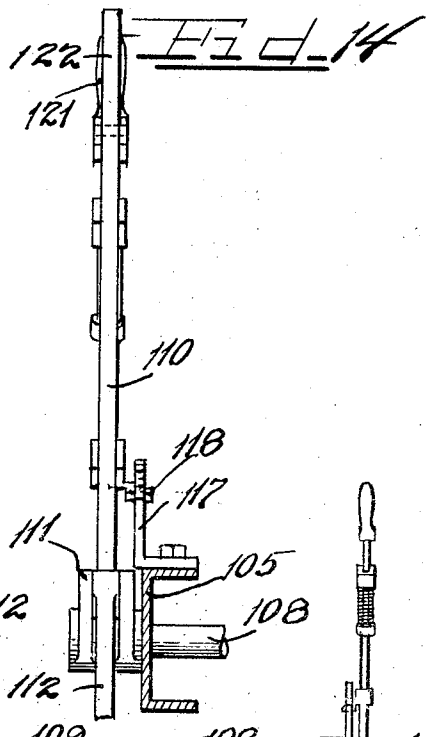
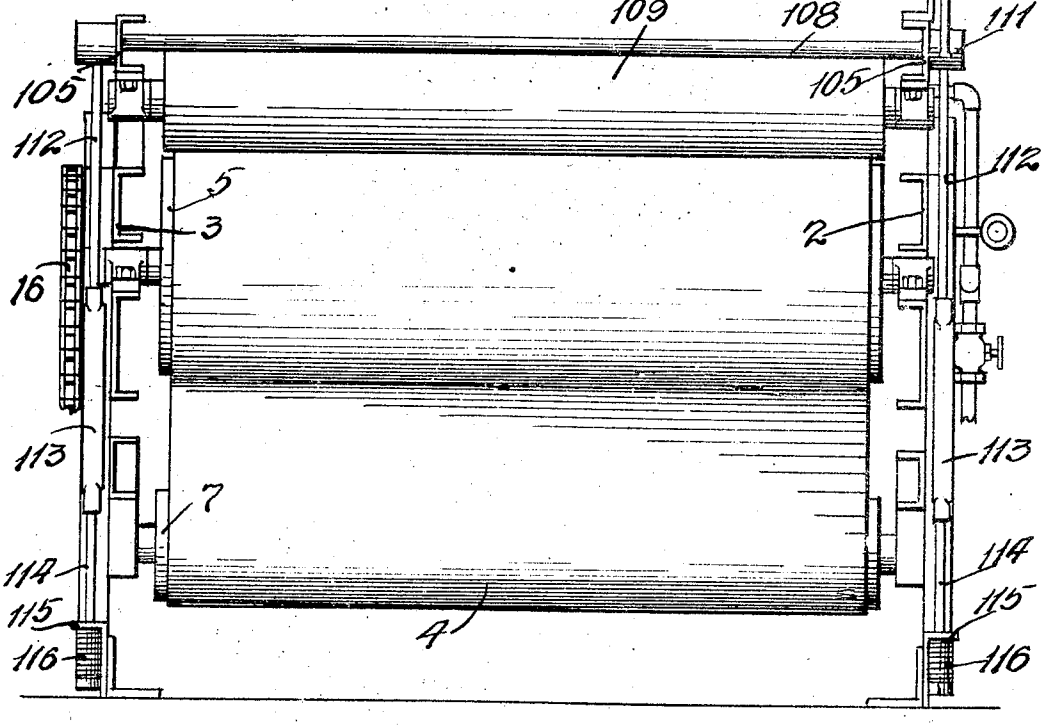


Fig. 12



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UNITED STATES PATENT OFFICE

2,310,541

CLEANING MACHINE

James J. O'Brien and James Strad, Chicago, Ill.

Application June 21, 1939, Serial No. 280,254

18 Claims. (Cl. 68—3)

This invention relates to improvements in a cleaning machine, and more specifically to an automatic machine highly desirable for cleaning rugs, carpets and articles of like character, although the invention may have other uses and purposes as will be apparent to one skilled in the art.

We are aware that in the past many and various types of rug and carpet cleaning machines have been provided, but we are not aware of any machine capable of automatically providing the proper cleansing action of the brushes or scouring means equivalent to the desirable oscillatory action only heretofore obtainable from hand driven machines. These hand operated machines required an operator to grasp the handle of the machine and follow it around the rug, manipulating the machine to provide the proper oscillatory action. Obviously, a skilled operator was required, and the human element entered into the quality of the work, injury being done to the rug in the event the operator did not keep the machine continuously in motion. An objectionable amount of time and labor were necessary to clean rugs in that manner.

Formerly known automatic rug cleaning machines were objectionable in that they frequently required more than one operator, there was danger of injury to a rug by a concentration of rubbing action in one location upon the rug, and if a wringer was used with the machine, the wringer was in the form of a separate unit either disposed a material distance away from the cleaning machine proper or else moved adjacent the machine but still being a unit separate from the machine proper.

With the foregoing in mind, it is an important object of the present invention to provide a cleaning and wringing machine for rugs, carpets and the like, which machine automatically and properly cleanses a rug, receiving the rug in a dirty condition and discharging the rug not only clean but wrung out ready to hang up in the drying room.

Another object of the invention is the provision of a rug cleaning and wringing machine which automatically cleans and wrings a rug in a very short time and requires the services of only one operator, including the placing of the rug in the machine.

A further object of the invention is to provide a single automatic machine which wets, soaps, washes, rinses and wrings out a rug, carpet or the like.

Another feature of the invention resides in the provision of a machine to automatically clean a rug, incorporating a single conveyor upon which the rug may be placed at one end of the machine, and from which the rug emerges at the opposite end of the machine ready for hanging up in the drying room.

Still a further object of the invention is the provision of a rug cleaning machine incorporating scouring means in the nature of brushes having an action which is the full equivalent of the desired oscillatory motion, and in which the brush action can never be concentrated upon a single area of the rug and no spot on the rug is missed by the scouring means.

It is further contemplated that the present invention provide a cleansing machine incorporating a plurality of rubbing or scouring members disposed in spaced relationship, so as to successively pass across the article being cleaned in reaches spaced longitudinally of the article, while each rubbing member rotates about its own axis.

The invention also embodies a machine for cleaning rugs and the like, including a conveyor for carrying the rug through the machine nd a set of brushes both rotating about their axes and traveling in successive order across the rug, the conveyor and brushes each being separately driven and separately controlled.

Still another object of the invention is the provision of a rug cleaning machine embodying a conveyor for carrying the rug through the machine, and means to control the operation of the conveyor accessible at substantially any point along the side of the machine.

A further object of the invention resides in the provision of a rug cleaning machine which is operable in either direction to effectively clean a rug. In other words, the rug carrying elements may be operated forwardly, stopped or actuated in the reverse direction, and the machine is capable of cleaning a rug while the conveyor moves in either direction.

The invention further provides a rug cleaning machine in which cleaning compound is supplied and is manually regulated both as to amount and as to location of application to the rug. In other words, if a rug of lesser width is put through the machine, the cleaning compound may be applied to the rug only by a simple adjustment, and if a rug of greater width is put through the machine, the cleaning compound may be applied entirely across the rug if so desired.

It is a further object of the invention to pro-

vide a rug cleaning machine which functions very effectively and without any injury to the rug to clean the frings of a rug.

It is also a feature of the invention to provide a rug cleaning machine having a conveyor to carry a rug through the machine, which conveyor functions as a part of the wringer mechanism for wringing the rug after it has been cleaned.

Still another feature of the invention resides in the provision of a rug cleaning machine incorporating an extremely easy-action wringer mechanism, wherein a wringer roll may be moved to or from wringing position by a simple single movement of the arm of the operator, and wherein the wringer roll may be spring-biased if desired to aid in providing considerable pressure by a simple lever action.

A still further object of the invention is to provide a cleansing machine construction incorporating a set of rubbing elements which may be in the form of brushes, scourers, sanders or the like, and which travel in series over the surface being cleansed while each rotates about its own axis, the rubbing members having a plurality of spaced paths over the article, if so desired.

A further object of the invention resides in the provision of a rug cleaning machine which is economical in construction and operation, highly efficient in action, and which automatically and completely cleans a rug in an extremely short time.

While some of the more salient features, characteristics and advantages of the present invention have been above pointed out, others will become apparent from the following disclosures, taken in conjunction with the accompanying drawings, in which:

Figure 1 is a fragmentary side elevational view of a cleansing machine embodying improvements of the present invention;

Figure 2 is an enlarged fragmentary top plan veiw of the right central portion of the structure shown in Figure 1;

Figure 3 is an enlarged fragmentary vertical sectional view of the central and left-hand portion of the structure seen in Figure 1, taken substantially as indicated by the line III—III of Figure 2;

Figure 4 is an enlarged fragmentary plan sectional view, with parts removed, taken substantially as indicated by the staggered section line IV—IV of Figure 1;

Figure 5 is a fragmentary vertical sectional view, taken substantially as indicated by the staggered section line V—V of Figure 3;

Figure 6 is an enlarged fragmentary side-elevational view of the scouring mechanism taken from the right-hand side of Figure 2;

Figure 7 is a fragmentary vertical sectional view, taken substantially as indicated by the staggered section line VII—VII of Figure 6;

Figure 8 is an enlarged fragmentary vertical sectional view through the scouring or washing mechanism, taken substantially as indicated by the line VIII—VIII of Figure 2;

Figure 9 is a fragmentary side elevational view, taken on the opposite side of the machine from the showing in Figure 6, or from the left-hand side of Figure 2;

Figure 10 is a fragmentary vertical sectional view, taken substantially as indicated by the line X—X of Figure 9;

Figure 11 is a fragmentary vertical sectional view, taken substantially as indicated by the line XI—XI of Figure 2;

Figure 12 is an end elevational view of the machine, taken from the left-hand side of Figure 1;

Figure 13 is an enlarged fragmentary side elevational view of a portion of the wringer control mechanism seen in the upper left-hand portion of Figure 1;

Figure 14 is a fragmentary vertical sectional view, taken substantially as indicated by the line XIV—XIV of Figure 1, illustrating the structure of Figure 13 from the right-hand side thereof.

As shown on the drawings:

In the illustrated embodiment of the present invention, there is shown a rug-cleaning machine for laundering rugs, carpets and similar articles. It is obvious that the machine may be made of any desired width to accommodate substantially any desired width of rug. Due to the novel construction of the machine, it makes no difference whether a rug is fed through the machine endwise or sidewise, although the rugs will usually be fed into the machine endwise for purposes of convenience. In other words, a 9 by 12 foot rug will be started through the machine at one of its 9 foot ends. Only one operator is required to handle the machine, there being ample time for the operator to place one corner of a relatively wide rug upon the conveyor and then go around to the other side and adjust the opposite corner, lining up the end of the rug for proper passage through the machine. The attendant may walk along the side of the machine, watching the progress of the rug through the machine, and having absolute control over the operation of the machine at all times and governing the movement of the conveyor belt from substantially any point alongside the machine.

The machine as illustrated is capable of wetting, applying a cleansing compound, scouring, rinsing and wringing out a rug in one single passage through the machine. If the rug is exceptionally dirty or is badly soiled in an area, it is a simple expedient for the attendant to reverse the conveyor and carry that portion of the rug back through the scrubbing or scouring means, the machine being so equipped that, with the exception of the wringing mechanism, it will provide a rug with the same identical cleansing treatment in either direction of travel of the conveyor. For the purpose of commercially cleaning rugs, the only apparatus which need be associated with the illustrated embodiment of the machine amounts to merely a dipping tank in which to dip the rug before it is placed upon the conveyor and some drain or collecting means for the liquid removed from the rug by the wringing mechanism. The latter device may be proper drainage openings in the floor upon which the machine stands or a suitable form of tank may be disposed beneath the machine. When the rug leaves the machine, it is ready for hanging up in a drying room.

The machine in general

With reference more particularly to Figure 1 of the drawings, it will be seen that the illustrated embodiment of this invention includes a frame 1 which may be composed of a series of channel members or equivalent frame construction and which is provided with a pair of opposed top rails 2 and 3, the rail 2 being upon the control side of the machine and the rail 3 upon the driving side. The various shaftings and other elements of the machine are, of course, supported by the frame 1 and the rails 2 and 3.

as will be apparent without specific description of each bearing, pivot point, etc.

As the machine is viewed in Figure 1, a rug to be cleaned preferably enters the machine from the right-hand end thereof and is discharged, cleaned and wrung out from the left-hand end of the machine. The rug is carried through the machine upon a conveyor which may be in the nature of an endless belt 4 preferably equal to or greater than the width of the rug to be cleaned, and preferably of some moisture-proof material, such as a rubber compound. The belt is trained over a driven roll 5 at the finish end of the machine and an idler roll 6 at the start end of the machine, the rug being carried flatly upon the upper reach of the belt which functions as an operating bed for the machine. With reference to Figures 1 and 3, it will be seen that the lower reach of the belt is pressed outwardly or downwardly by an idler roll 7 in order to keep the belt under proper tension. This idler roll 7 is carried on the free end of a frame structure 8 pivoted as indicated at 9 to the machine frame 1. The idler roll support 8 is spring-biased, as indicated at 10, on a rod 11 having one end attached to a part of the frame 1 and the other end to the idler roll support. This construction, as stated above, maintains the belt under proper tension at all times, and the tensioning mechanism is out of the way of the cleansing parts of the machine, since all work by the machine is done upon the rug on the upper reach of the belt.

As a rug is carried through the machine on the upper reach of the belt 4, it first passes beneath a water or similar liquid supply, generally indicated by numeral 12, there being a plurality of pipes, two being illustrated. Following the wetting from the water supply, the rug next arrives beneath a cleansing compound supply, generally indicated by numeral 13, which delivers liquid soap or some other suitable cleansing medium to the rug. After the cleansing compound has been supplied to the rug, it passes beneath the scouring mechanism, generally indicated by numeral 14, which thoroughly and effectively washes the rug. On the other side of the scouring mechanism is another delivery from the cleansing compound supply which may be selectively turned on or off, and still beyond this second cleansing compound supply is a plurality of pipes for additional water supply. Following the last water supply pipes, the rug enters the region of the wringing mechanism, generally indicated by numeral 15. It will be noted that the rug may be reversed in direction and receive the water, cleansing compound and the scrubbing action while traveling in either direction, the wringer mechanism being left in open position until it is desired to actually wring out the rug and deliver it to the drying room.

The machine is entirely automatic in action, and once a rug is started through the machine, the rug is thoroughly cleaned before it is discharged through the wringing mechanism at the finish end of the machine. As many reversals in direction for repeated washings of certain parts of the rug as may be deemed necessary can very readily be made, and if the rug is of the fringed type, the fringes may be thoroughly cleansed by the machine without injury to the body of the rug.

As will more fully later appear herein, the operator need only start the rug through the machine, regulate the cleansing compound supply as to amount and location, if regulation of the latter is necessary, govern the reversal in direction of travel if deemed desirable, and by a simple movement operate the wringing mechanism when it is time to discharge the rug from the machine. The machine is substantially foolproof to the extent that a considerable amount of negligence on the operator's part will not result in injury to the rug.

The conveyor drive mechanism and control means therefor

As before stated, the roll 5 is the driven roll which directly causes motion of the conveyor belt 4. With reference more particularly to Figures 1, 3 and 4, it will be seen that the roll 5 is driven through a suitable sprocket wheel and chain connection 16 or the equivalent from a source of power, such as an electric motor 17 (Figure 4). The motor is preferably equipped with a reduction gear box 18 to furnish the proper conveyor speed. Of course, the motor may be connected with any suitable source of electrical energy provided with a direct control switch if desired.

In order to provide the operator with instantaneous control of the movement of the conveyor belt from substantially any point along the side of the machine, a motor control in the nature of a reciprocable hand rail 19 is provided. This rail extends substantially along the entire side of the machine and is slidably mounted in a plurality of eye-bolts 20 or the equivalent attached to the frame 1. An arm 21 attached to an intermediate point of this lever (Figure 4) is pivotally connected to a crank arm 22 fixed to a shaft 23 extending transversely of the machine beneath the upper reach of the belt 4. On the motor side of the machine, the shaft 23 carries another crank arm 24 which is pivoted to one end of a lever 25, and the lever in turn is pivoted to another crank arm 26 on a shaft 27 extending into the control box of the motor 17. Accordingly, when the rail 19 is reciprocated in one direction, the belt 4 moves in that direction. When the rail is moved to middle position, the motor is stopped and the belt accordingly does not move, and when the rail is moved in the opposite direction from middle or stop position, the belt moves in the opposite direction.

It will be noted, therefore, that it is a simple expedient for the operator at any time during the process of cleaning a rug to grasp the hand rail 19 at any point therealong and reciprocate the rail to either stop or reverse the direction of the belt. Such a control is valuable as a safety feature also, since the operator has instantaneous control over the conveying mechanism of the machine.

Water or liquid supply

The rug wetting means are best illustrated in Figures 1, 2 and 3. In most instances, it will be satisfactory to wet the rug being cleaned with water, although some other desirable liquid might also be used. To this end, a pipe 28 (Figure 1), leading from a suitable source of liquid supply under pressure, is provided with a master valve 29 and is suitably connected to a distributing pipe 30 extending along the side of the machine. Suitable risers 31 lead upwardly from the distributing pipe 30 and each riser is connected to a transversely extending spray pipe 32 disposed a reasonable distance above the upper reach of the belt 4 in position to spray the liquid under

pressure onto the rug through numerous relatively minute holes **33** (Figure 3) distributed along the underside of each of the spray pipes. On the end thereof opposite the risers, the spray pipes are dead-ended, as indicated at **34** in Figure 2. In the present instance, as seen clearly in Figure 1, there are two spray pipes shown on the starting side of the machine and three spray pipes disposed between the scrubbing means and the wringer mechanism. The three spray pipes which apply liquid to the rug before it reaches the wringer mechanism take the place of the commonly known squeegees for removing the accumulated or loosened dirt from the rug. In other words, liquid striking the rug from these spray pipes under pressure effectively rinses the rug before it enters the wringing mechanism.

It is obvious that any desired number of spray pipes may be provided, and that each spray pipe or its respective riser may be equipped with individual valve control means.

Cleansing compound supply means

The cleansing compound supply means, generally indicated by numeral **13** in Figure 1, are best illustrated in Figures 2, 3 and 5. As previously mentioned, means are provided to distribute cleansing compound on the rug on each side of the scouring means. Both of these distributing portions may be supplied from the same tank **35**, disposed off to one side of the machine (Figure 3). A supply pipe **36** leads from the tank **35** to substantially a central position over the machine. This pipe is equipped with a master valve **37** which may be actuated from the side of the machine by a suitable pull member or tension element **38**. The valve is manually controlled so that the operator has absolute control at all times over the supply of cleansing compound. This lever valve **37** controls the supply of compound through a header pipe **39** which in turn is connected at each end thereof to a pair of distributing pipes **40** and **41** respectively. The connections from the header **39** to the distributing pipes are at intermediate points of the distributing pipes where three-way valves **42** and **43** respectively govern the flow of compound through the pipes **40** and **41**.

With reference to Figure 5, the three-way valve **42**, for example, may be adjusted to supply compound to that portion of the pipe **40** to the left of the valve or to that portion of the pipe to the right of the valve, or to both portions of the pipe, or the supply of fluid may be cut off entirely. The valve **43** may be operated in the same way. Accordingly, the location of application of cleansing compound to the rug may be adjusted substantially as desired.

If a rug is being cleaned which is substantially only half the width of the conveyor belt **4**, one of the distributing pipes **40** or **41** may be cut off by its valve and the other valve adjusted so that both portions of the spray pipe function, the rug being placed upon that half of the belt **4** beneath the operating distributing pipe. If it is desired to concentrate upon the central portion of a relatively wide rug, each of the valves **42** and **43** may be adjusted so as to supply only the inner portion of its respective distributing pipe. Other adjustments of these valves will be apparent from the foregoing, so that in the event a relatively narrow rug is being cleaned, it is not necessary to distribute cleansing compound over the vacant portion of the conveyor belt. Likewise, if some portion of the rug needs more than one cleansing operation and other portions of the same rug do not, the second application of cleansing compound may be made to the needed portion only.

The valves **42** and **43** may be reached by the operator from either side of the machine. The master valve **37** is controlled through the pull member or cable **38** from the side of the machine so that the cleansing compound is only applied to the rug at the specific time when it is actually needed.

Exactly the same structure as above described is also located on the opposite side of the scrubbing mechanism, as seen in Figure 3, in case it is desired to reverse the movement of the rug and repeat the cleaning operation on the backward travel.

The washing or scrubbing mechanism

This mechanism is illustrated in Figures 2, 3, 4, 5, 6, 7 and 8. It is provided with a drive separate from the conveyor belt **4**. On the driving side of the machine, a suitable driving element, such as an electric motor **44** provided with a reduction gear box **45**, through which the motor drives a vertical shaft **46**, may be provided (Figures 3, 4 and 5). Through a suitable chain and sprocket connection **47** or the equivalent, the shaft **46** drives another vertical shaft **48** on the upper end of which is a driving pulley **49**. On the opposite side of the machine, a free pulley **50** is mounted on a shaft **51**. Trained over these pulleys is an endless belt **52** to which at spaced intervals a brush carrying bracket **53** is riveted as indicated at **54** (Figure 8). Each pulley is provided with a pair of spaced grooves **55** to accommodate the heads of the rivets **54**.

With reference more particularly to Figures 2, 6, 7 and 8, it will be seen that a pair of vertical spaced channels **56** extend transversely across the machine between the pulleys **49** and **50** along each transverse reach of the belt **52**. Each of these channels receives a row of the aforesaid rivets **54**, and the belt bears against the legs of the channel members, as seen best in Figure 8. These channels **56** are brazed or otherwise secured to a plurality of spaced yokes **57**. The cross leg of each yoke is bolted or otherwise secured to a pair of spaced transverse supporting channels **58—58** cross-connected at each side of the machine by a supporting channel **59**.

With reference to Figures 7 and 8, it will be seen that each of the pulley shafts **48** and **51** is provided with an upper bearing **60** and **61** respectively, which bearings are connected across the machine by a pair of transverse tie rods **62—62**. A lower bearing is also provided for the pulley shaft **51** which is in the nature of a floating bearing **63** bolted to a plate **64**, as indicated at **65** (Figures 6 and 7). A plurality of hollow adjusting bolts **66** are threadedly engaged with the plate **64**. Each of the bolts **66** has a supporting and locking bolt **67** extending therethrough to connect the plate **64** with the top rail **2** of the frame **1**. It is a simple expedient, therefore, to loosen the aforesaid tie rods **62**, the locking bolts **67**, and move the bearing carrying plate **64** in and out by operation of the adjusting bolts **66** to such a position of the pulley **50** so as to take up any slack and maintain the belt **52** at the proper tension. The pulley may be again anchored in its new position by tightening the supporting bolts **67** and tightening the tie rods **62**.

With reference to Figure 8, it will be seen that each brush holder **53** journals the shaft **68** of a

vertically disposed scrubbing brush 69. Each brush, while keyed to its shaft to rotate therewith, is nevertheless slidable on its shaft and is spring-biased downwardly, as indicated at 70, so that the brush will readily pass over any obstructions or changes in level during its travel with the belt 52. Fixed to the upper end of the brush shaft 68 is a pinion 71 which meshes with a sprocket chain 72 carried in a channel 73 brazed or otherwise secured to the aforesaid supporting yokes 57. As is apparent from the showing in Figure 2, the channel 73 and sprocket chain contained therein extends throughout the travel of the belt 52, that is, in an endless path twice across the machine and circling the outer portions of the pulleys 49 and 50 at each side of the machine. The sprocket chain 72 may be driven, if so desired, in a direction opposite to the movement of the belt 52, but is preferably fixed in position. It will therefore be seen that as the brush carrying belt 52 follows its course over the pulleys 49 and 50, the brushes will not only be carried bodily in single file spaced relationship across the rug in two separate spaced paths corresponding to the reaches of the belt 52, but these brushes will also simultaneously be rotated each about its own axis by virtue of the engagement of the pinion 71 with the sprocket chain 72. The motion of the brushes in indicated by arrows in Figure 4.

At the same time, the rug being cleaned is also traveling in either direction beneath the spaced transverse paths of the brushes. Consequently, it is virtually impossible, even though the conveyor belt and rug may be stopped, to concentrate the action of a brush on a single small area of the rug. In order to rotate, the brushes must travel in series across the rug. Only an extremely long and unwarranted stopping of the conveyor could result in the rug being worn underneath the reaches of the belt 52.

Referring to Figures 3 and 8, it will be seen that the belt 52 is maintained in proper position and the brush gear 71 prevented from disengagement with the sprocket chain 72 by a pair of reversed channels 74—74 carried on a pair of supporting units 75—75 attached to the top rails 2 and 3 of the frame. The brush holders 53 bear against the channels 74—74 during their travel across the machine. A similar construction is provided for the other reach of the belt 52. As seen in Figures 3 and 5, an idler roll 76 is disposed beneath the conveyor belt 4 directly under each of the transverse brush paths. These idler rolls provide adequate backing for the scrubbing action of the brushes, and it will be noted that the rolls are preferably so sized as to be of somewhat less diameter than the fiber arrangement of the brushes, so that a substantially flat surface is not provided as a backing beneath the conveyor belt.

From the foregoing, it will be appreciated that there is a decidedly advantageous brush action embodied in this machine. This action of the brushes approximates and is the full equivalent of the desired oscillatory action obtainable heretofore only from a hand-operated machine. It will be further appreciated that each brush, while rotating about its own axis, passes transversely across a rug surface traveling at right angles to the brush path. This combination of three different movements acting simultaneously provides a very thorough and effective scrubbing action, with no continuity of rubbing in any single area of the rug, so that the rug is cleaned to a very high degree with no danger of injury through excessive rubbing. It will also be understood that this particular scrubbing, scouring or rubbing mechanism may be adapted for other uses besides rug-cleaning per se.

For example, by covering the brush fibers or substituting a different brush head, the mechanism may be used for polishing veneer or the like which could also be carried on the conveyor belt, the same as a rug. Likewise, by substituting a still different form of head, the brushes might be used for sanding purposes to smooth down, even up or clean a surface by removing ground-in dirt therefrom. The main feature of the construction resides in the fact that the rubbing or scouring action cannot be concentrated in one location for a sufficient length of time to injure the article being cleaned unless a deliberate attempt at injury is made. The short time required to stop and reverse the direction of the conveyor belt is far too small for any injury to the article to result.

It is desirable to maintain the brushes as clean as possible at all times and prevent loose nap and fibrous or packed dirt from accumulating on the brushes. It will be noted that the brushes pass entirely off the rug at each side of the machine when traveling around the pulleys 49 and 50. To this end, a half-round plate 77 is disposed in the path of the brushes around the pulley 49 and a similar plate 78 is disposed in the path of the brushes around the pulley 50. The brushes, of course, will travel over the upper surfaces of these plates. As seen best in Figure 2, each plate is provided with numerous apertures or openings 79, thus providing a series of edges for combing the brush fibers as they travel over the plates. If so desired, the margins defining each opening may be raised slightly from the surface of the plates to afford a better combing action.

A slidable rug margin holder 80 is provided on the plate 77, and this holder is pushed inwardly over the edge of the rug beneath the path of the brush at the point where the brush starts over the rug, to prevent the edge of the rug from being buckled or folded inwardly by the brush. Likewise, a similar slidable plate 81 is associated with the brush combing element 78 on the opposite side of the machine, and the plate 81 will, of course, cover the margin of the brush on the other path of travel of the brushes across the rug. Therefore, that small marginal portion of the rug covered by the plate 80 during the scrubbing operation will not be omitted but will be cleansed by the other reach of the brushes. Likewise, the margin of the rug covered by the plate 81 will be cleansed by the previous reach of the brushes before it is covered by this plate, assuming that the rug is traveling towards the wringer or discharge end of the machine. It will be further noted that the combing openings 79 are preferably omitted in that part of the members 77 and 78 overlying the plates 80 and 71, so that no dirt or debris is combed from the brushes over these plates to be in position to be pushed back upon the rug surface.

The holding mechanism

In addition to the plates 80 and 81 which prevent the margins of the rug from being buckled or picked up by the brushes, with certain types of rugs, especially what may be termed a soft rug, it is desirable to hold the

central portion of the rug flatly upon the conveyor belt beneath the brushes, to prevent buckling or drifting of this portion in the direction of travel of the belt 52, thus avoiding any buckling or twisting of the rug since the brushes travel in opposite directions on their respective reaches. To this end, it will be seen, with reference to Figures 2, 3, 4 and 11, that a bar 82, preferably polygonal in cross-section to provide a flat surface, is rotatably mounted on one side of the scrubbing mechanism between the opposed frame members 75—75. A smaller bar 83 is held in proximity to one of the flat surfaces of the bar 82 by a series of wing nuts 84 or the equivalent. Between the two bars, a series of spaced flat spring elements 85 are tightly clamped adjacent the ends of the elements. The bars, of course, are raised a distance above the surface of the conveyor belt so that a considerable portion 86 of each spring element lies flatly on the conveyor belt or on the rug carried thereby.

With reference to Figure 3, it will be seen that the free end of each element 85 is upwardly turned, as indicated at 87, so that when the conveyor belt is reversed in direction, the rug will readily pass under the elements. The desired angular position of the supporting bar 82 is maintained by means of a lever 88 bolted to the bar at one end, as indicated at 89, and the other end of which is turned at an angle and threadedly engaged with a bolt 90 passing therethrough and abutting the top rail 2 of the frame 1. It will be appreciated that by turning the bolt 90, the angle of the bar 82 may be changed and the tension upon the spring elements 85 may be varied as desired.

On the opposite side of the washing mechanism, a similar bar construction is provided to hold a number of like spring pressing elements 91 having the major portions 92 thereof pressing against the conveyor belt or the rug carried thereby. As seen in Figure 3, the free ends of these elements are also upturned, as indicated at 93, so that the rug may easily pass beneath the elements. Referring more particularly to Figure 4, it will be seen that the elements 91 are staggered relatively to the elements 85. The free ends of the elements overlap in extent, and the elements are of such length that this overlapping only occurs between the two transverse paths of the brushes.

During their course of travel transversely across the rug, the brushes pass over the portions 86 of the elements 85 on the first reach, and over the portions 92 on the elements 91 on the second reach. Of course, those stripe-like portions of the rug beneath the elements 85 will not be cleansed on the first reach of brushes but will be cleansed on the second reach of brushes, due to the staggered relationship of the holding elements 85 and 91. With the overlapping of the elements occurring only between the brush reaches, every point of the rug is contacted by the brushes either on one line of travel or the other. The rug is held down firmly by the spring elements against the conveyor belt, and there is no chance of buckling or twisting of the rug. The brushes pass easily over the spring elements and over the combing plates at the sides of the machine, due to the fact that the brushes are spring-biased, as above explained, and may reciprocate slightly relatively to their axes against the action of the springs 70.

In view of the fact that regardless of the number of reversals in direction made during the course of travel of the rug the rug always must travel towards the wringing mechanism to be properly discharged from the machine, it is desirable to agitate the second series of spring holding elements 91 to avoid any possibility of these elements leaving noticeable stripes on the rug where the nap is pressed down by the spring members. To this end, the main supporting bar 82*a* for the spring elements 91 is provided with an extension 94 passing through an aperture in the adjacent frame members 75, as seen best in Figures 9 and 10. The extension 94 is provided with a fixed collar 95, and between the collar and the frame members 75, a spring 96 is disposed which urges the extension 94 outwardly at all times.

The agitating mechanism receives its drive from the shaft 48 of the pulley 49. This drive mechanism includes a shaft 97 driven at one end through a pair of bevel gears 98 on the shaft 48. On the other end of this shaft is a fixed plate 99, and a pitman 100 has one end eccentrically connected to this plate, as indicated at 101. The other end of the pitman is connected to one arm of a bell crank 102 pivoted to a supporting bracket 103, as indicated at 104. The other arm of the bell crank rests against the aforesaid extension 94 on the holding bar 82*a* for the spring elements 91.

Accordingly, as the shaft 97 is rotated, the pitman swings the upper arm of the bell crank inwardly and outwardly, thus reciprocating the bar 83*a* a distance preferably slightly in excess of the width of one of the spring elements 91. This distance should not be sufficient to cause the portions 92 of these elements to bump into the portions 86 of the elements 85. The spring 96 maintains contact between the extension 94 and the upper arm of the bell crank 102 at all times. The reciprocation is preferably synchronized with the travel of the brush supporting belt 52 so that any pressure marks which may be caused by the spring elements will be immediately erased by the second reach of brushes.

The wringing mechanism

This mechanism is best shown in Figures 1, 12, 13 and 14. The wringer mechanism is extremely simple in construction and very easily operated. This mechanism includes a pivotally mounted frame comprising a pair of channel members 105—105, each of which has an angularly turned end 106 pivotally connected to an upright of the frame 1, as indicated at 107 (Figure 1). These members are cross-connected at their outer ends by a shaft 108. The outer portion of the frame extends beyond the main machine frame 1, and in the intermediate portion of the frame, a wringer roll 109 is carried. This roll is freely rotating and when the frame is lowered to the position seen in Figures 1 and 12, the wringer roll bears against the conveyor belt 4 directly over the conveyor drive roll 5. The conveyor belt and drive roll 5 thereby form a part of the wringer mechanism, and the rug is squeezed between the wringer roll 109 and the conveyor belt 4 over the roll 5 to press out liquid contained in the rug after the cleaning operation.

The wringer frame is actuated by a simple hand lever 110 having a bell crank formation 111 at its lower end collared to the shaft 108. The other leg of this bell crank formation is pivoted to one end of a tension link 112 coupled by a turnbuckle 113 to a similar link 114 extend-

ing through a lug 115 on the frame, and spring-biased as indicated at 116 beneath the lug. The tension on the spring 116 may obviously be adjusted by turning the turn-buckle 113. A similar link, turn-buckle and spring-biasing construction is associated with the other end of the shaft 108 on the other side of the machine.

Anchoring means of any suitable form to lock the wringer frame in operative position may be utilized, such, for example, as a segmental rack 117 mounted on one of the frame members 105. This rack may be selectively engaged by a dog or tooth 118 on the lower end of a rod 119, spring-biased as at 120 to urge the tooth into engaging position, and pivotally connected at its upper end to a pivotal actuator or handle 121. It is obvious that when the actuator 121 is squeezed towards the handle 122 of the lever 110, the tooth 118 is disengaged from the rack 117 and the wringer frame may be elevated out of operative position. A single gripping of the two handle portions 121 and 122 and an outward and downward pull upon the lever 110 results in a lowering of the wringer frame which, aided by the spring-biasing 116—116, provides considerable leverage with little exertion on the operator's part. It will be especially noted that the wringer may be moved to operating position or elevated out of operating position by a simple and easy movement of the lever 110. It will further be noted that while the wringer construction might be built as an economical separate unit, merely by utilizing the roll 5 and providing it with a drive, without using the conveyor belt 4, as illustrated, the wringer unit forms an economical and substantially integral part of the washing machine, and no separate unit is necessary, every operation for cleaning the rug being performed on the one unitary machine.

One of the important features of the wringer construction just described is safety to the operator. With wringers of the types heretofore known, especially in the rug cleaning field, an operator too frequently suffered serious injury by accidentally catching his hand between the wringer rolls. This was not altogether the fault of the operator, since he had to line the leading edge of the rug in close proximity to the wringer rolls. With this invention, however, there is no need for the operator to bring his hands into proximity to the operating wringer roll. Once having lined the leading edge of the rug on a conveyor at a distance from the wringer, the operator has no cause to place his hands near the operating wringer.

The operation

In utilizing the present machine for the purpose of cleaning a rug, it is desirable, but not essential, for the operator to first dip the rug in water or the like. The rug is next applied to the conveyor belt 4, a wet rug adhering better to the conveyor belt than a dry one. There is ample time for the operator to apply one corner portion of a relatively wide rug and then walk around and apply the other corner portion evenly to the belt before the rug reaches the washing compound supply means.

Referring to Figure 1, the simplest expedient would be to apply the opposite corner portion of the rug first, then apply the corner portion on the visible side of the machine. The application of the rug may be done before or after the conveyor belt has been started, the rug being frequently applied to the belt while moving and while the washing mechanism is also in operation. As explained above, the washing mechanism may be started from any suitable point, and the conveyor mechanism may be started by reciprocation of the hand rail 19.

The water may be turned on at the valve 29 at any desirable time. As the rug passes through the machine, it is wet by the first set of spray pipes 32, and then the operator, by pulling the cord 38 on the lever valve 37, supplies the right amount of cleansing compound to the rug. The rug next passes beneath the above described scrubbing mechanism where every part of it is thoroughly cleansed by the brushes 69, with no danger of the occurrence of buckling, drifting or wear resulting from excess rubbing. The spring holding elements 85 and 91 keep the rug flatly on the conveyor belt beneath the brushes, and the novel brushing action combining simultaneously three separate movements, as above described, results in a thorough cleansing.

If the rug travels only once through the machine, the second cleansing compound supply means is not actuated. The rug next passes between subsequent sets of spray pipes where the loosened dirt, cleansing compound, etc., are thoroughly rinsed from the rug by the water under pressure emanating from the pipes, thus eliminating the need of the commonly known squeegee. After being rinsed, the rug enters the wringer mechanism which has been adjusted to operating position by a simple movement of the lever 110, and the water is pressed from the rug by the wringer mechanism. It will be noted that an idler roll 123 is preferably provided so as to bear upon the upper face of the rug before it reaches the wringer mechanism, causing a dip in the conveyor belt 4 so that water wrung out of the rug will drain away from the wringer. The rug leaves the wringer mechanism ready to be attached to a rack and hung in the drier room.

It will be noted that the conveyor belt may be stopped at any time by a movement of the hand rail 19, and if it is desired to again wash a portion of the rug, or all of it, the conveyor belt may be reversed in direction, the second set of spray pipes providing a suitable wetting, and the second cleansing compound supply means being actuated in the same manner as the first set. The rug receives the same wetting, cleansing compound and washing action when traveling in either direction.

Another novel feature of the present invention resides in its use as a cleaner of rug fringes. Quite frequently rugs are provided with fringes projecting from opposite ends of the rug. Assuming that it is desired to wash the fringes of the rug, it is a simple expedient to run the rug through the machine and then stop the conveyor belt when the fringe is underneath the first reach of the brushes and permit the brushes to travel across the fringe of the rug only until the fringe is clean. The rug is then passed through the washing mechanism and the trailing fringe may be stopped beneath the second reach of the brushes and the brushes permitted to act only upon this fringe until it is also thoroughly cleansed. Thus, each fringe of the rug may be thoroughly cleansed with no danger of injury to the rug.

If rugs narrower in width than the conveyor belt 4 are cleaned, the application of cleansing compound may be limited to the rug surface by proper setting of the valves 42 and 43 so that the cleansing compound is not wasted by a useless

distribution thereof over an empty portion of the conveyor belt.

It might further be mentioned that the machine is exceedingly rapid in operation, requires the attention of only one operator, is exceedingly durable and very economical.

It will, of course, be understood that numerous details of construction may be varied through a wide range without departing from the principles of this invention, and it is, therefore, not the purpose to limit the patent granted hereon otherwise than is necessitated by the scope of the appended claims.

We claim as our invention:

1. In a rug cleaning machine, a movable conveyor in the form of a moisture-proof belt arranged to carry a rug entirely through the machine, translatable and rotatable scouring means to act on the rug, and holding means over which said scouring means may travel to keep the rug flatly on the belt in the region of said scouring means.

2. In a rug cleaning machine, a conveyor belt arranged to carry a rug through the machine, washing means to act on the rug while on the conveyor belt, a spring-biased pivotal wringer roll movable into position to press the rug against the conveyor belt, a single pivotal hand lever to pivot the wringer roll towards and away from the rug and means for retaining said lever in a predetermined, adjusted position depending upon the pressure desired.

3. In a rug cleaning machine, a conveyor belt arranged to carry a rug through the machine, washing means to act on the rug while on the conveyor belt, a pivotal frame adjacent one end of the machine, a wringer roll carried on an intermediate part of said frame, a pivotal hand lever projecting from said frame to move it towards and away from the conveyor belt to selectively cause said wringer roll to press the rug against the conveyor belt, spring-biasing means associated with said frame, and interlocking means to hold said handle in various positions of adjustment depending on the pressure desired.

4. In a rug cleaning machine, a conveyor operable in either direction and arranged to carry a rug through the machine, liquid supply means to wet the rug on the conveyor, washing means to act on the rug on the conveyor, and control means operable to start and stop the conveyor and govern its movement forwardly and reversely while the operation of the washing means continues.

5. In a rug cleaning machine, a conveyor to carry a rug to be cleaned, means to move said conveyor in either direction, washing means to act on a rug carried by said conveyor, and cleansing compound supply means on each side of said washing means whereby a rug may be cleaned in either direction of movement of the conveyor.

6. In a rug cleaning machine, a conveyor arranged to carry a rug to be cleaned through the machine, means to move said conveyor in either direction, washing means disposed over an intermediate portion of the reach of said conveyor, cleansing compound supply means on each side of said washing means, and pressure water supply means on the opposite side of each of said cleansing compound supply means.

7. In a rug cleaning machine, a conveyor arranged to carry a rug through the machine, traveling washing means to act on the rug being carried, and spaced spring elements having free ends over which the washing means may pass bearing on the carried rug to hold it flatly against the conveyor beneath the washing means.

8. In a rug cleaning machine, a conveyor arranged to carry a rug through the machine, washing means to act on the rug being carried, said washing means being constructed and arranged to traverse the surface of a rug and spaced elements constructed and arranged to overlie the surface of the rug in flat surface engagement and over which the washing means may pass as it traverses the rug to hold the same with flat surface engagement against the conveyor.

9. In a rug cleaning machine, conveyor means arranged to carry a rug through the machine, washing means to act on the rug being carried, spaced resilient elements arranged to bear on the rug to hold it flatly on the conveyor means while the washing means are operating, and drive mechanism arranged to agitate said elements to prevent pressure lines on the rug.

10. In a rug cleaning machine, conveyor means arranged to carry a rug through the machine, washing means to act on the rug being carried, spaced resilient elements arranged to bear on the rug to hold it flatly on the conveyor means while the washing means are operating, drive means for said washing means, and other drive means operable from the first said drive means to oscillate said elements to prevent pressure lines on the rug.

11. In a rug cleaning machine, rug carrying means, washing means traveling transversely in spaced paths across the carrying means, and spaced flat spring-like elements over which the washing means may pass extending from locations on opposite sides of said washing means towards each other to hold the rug flatly on said carrying means while being washed, the elements on one side being staggered relatively to those on the other side to permit the washing means to contact all points of the rug.

12. In a rug cleaning machine, rug carrying means, washing means traveling transversely in spaced paths across the carrying means, and spaced resilient presser members over which the washing means may pass extending longitudinally of the carrying means from locations on opposite sides of said washing means and bearing on the carried rug, one set of said members being staggered relatively to the other set, and the ends of said members overlapping in extent between the paths of said washing means.

13. In a rug cleaning machine, rug carrying means, washing means traveling transversely in spaced paths across the carrying means, spaced resilient presser members extending towards each other from locations on opposite sides of said washing means and bearing on the carried rug, one set of said members being staggered relatively to the other set, and the ends of said members overlapping in extent between the paths of said washing means, and drive means arranged to oscillate en masse one set of said presser members to prevent pressure lines on the rug.

14. In a rug cleaning machine, a flexible conveyor arranged to carry a rug through the machine, a plurality of brushes mounted in spaced relationship on an endless carrier to travel transversely across the rug in reaches spaced longitudinally of the conveyor, said brushes moving beyond the rug at one side thereof during their travel, and brush combing means disposed outside the rug in position to act on said brushes when they pass beyond the rug.

15. In a rug cleaning machine, a conveyor ar-

ranged to carry a rug through the machine, a plurality of brushes mounted in spaced relationship on an endless carrier to travel transversely across the rug in reaches spaced longitudinally of the conveyor, and a roll beneath said conveyor directly opposite each reach of the brushes.

16. In a cleaning machine, a flexible conveyor to carry an article to be cleaned, a plurality of rubbing members arranged to travel in series in a plurality of spaced paths transversely across the article being cleaned while each of said members rotates about its own axis, and means to hold the article against the conveyor while the rubbing members act on the article.

17. In a rug cleaning machine, conveyor means to carry a rug through the machine, a plurality of washing brusnes, arranged to travel in series transversely across the machine in reaches spaced longitudinally of said conveyor means, brush combing means disposed at opposite sides of said conveyor, and a slidable member associated with each of said combing means movable inwardly to overlie the margin of the rug on said conveying means, said slidable members being arranged so that one is in each of said spaced brush reaches.

18. In a rug cleaning machine, conveyor means to carry a rug through the machine, washing means arranged to act on a rug on said conveyor means, and a slidable member on each side of the machine adjacent said washing means movable inwardly over the margin of the carried rug, said members being spaced apart in a manner to prevent the washing means from missing any part of the rug.

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