

[54] **CLEANING MACHINE**

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[58] Field of Search. **198/165, 167, 204; 134/125-127; 312/319; 15/77, 102**

[56] **References Cited**

UNITED STATES PATENTS

3,237,231	3/1966	Zink.....	15/102
1,750,675	3/1930	Loosley.....	312/319 X
555,481	2/1896	Grimmett.....	198/165
2,325,200	7/1943	Young	198/165 X

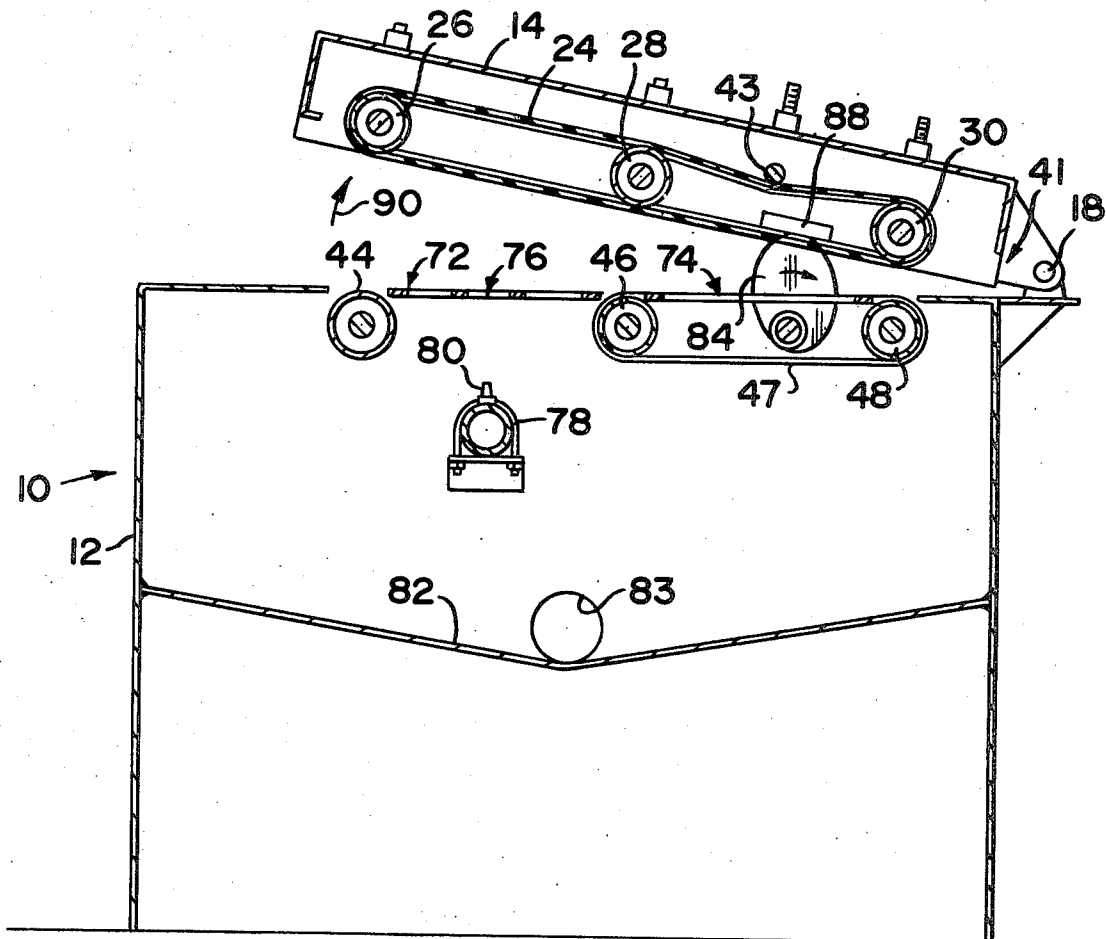
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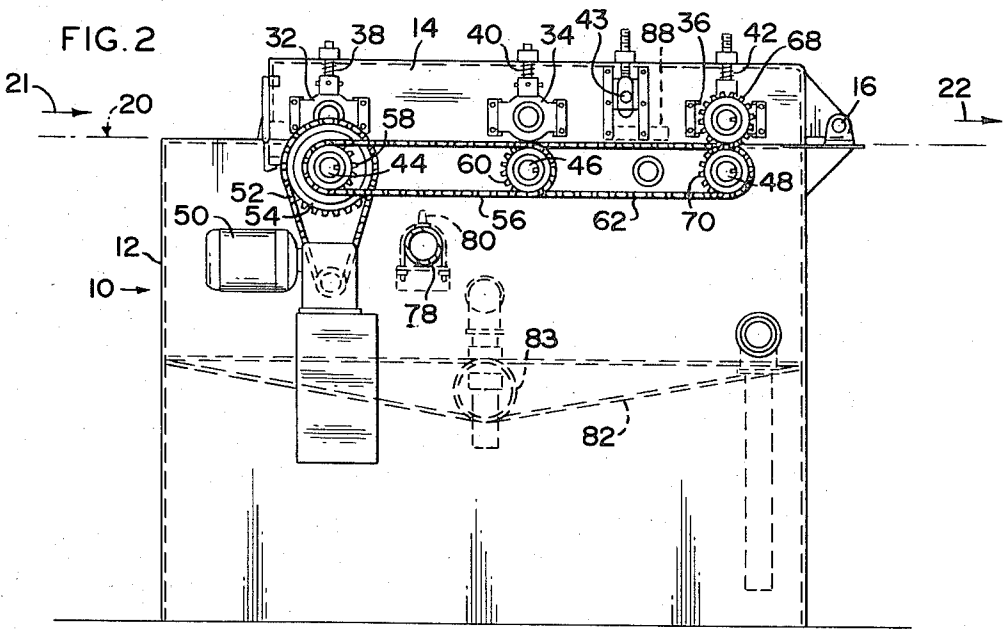
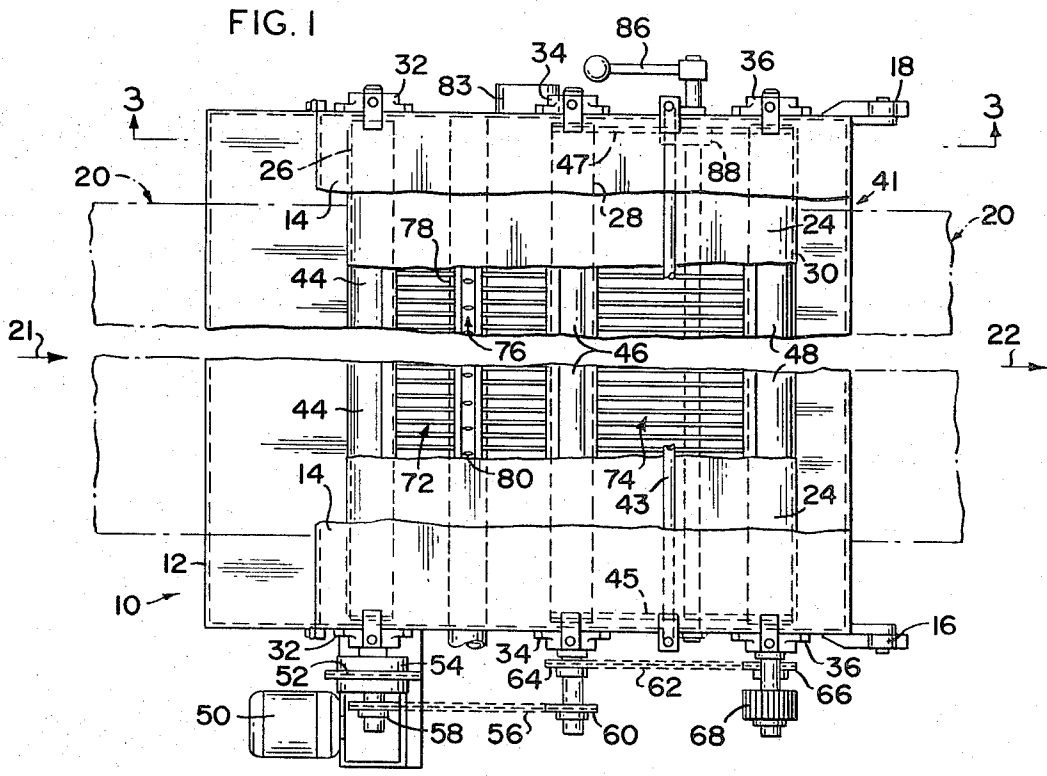
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[57] **ABSTRACT**

A machine designed to clean mats, rugs and the like by means of a high powered liquid spray impinging upon the mats as they are conveyed through the machine. An endless driven belt engages the upper surface of the mat and carries it through the machine, over grates through which the spray is directed. A pair of driven, spring-loaded rollers are positioned at the entrance and exit to the machine such that the first pair of rollers pulls the mat into the machine and the second pair of rollers forces the mat out the exit of the machine while simultaneously squeezing the excess water from the mat. Access to the interior of the machine is accomplished by a top which may be lifted from the tank of the machine by means of a lever and cam arrangement.

6 Claims, 4 Drawing Figures





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FIG. 3

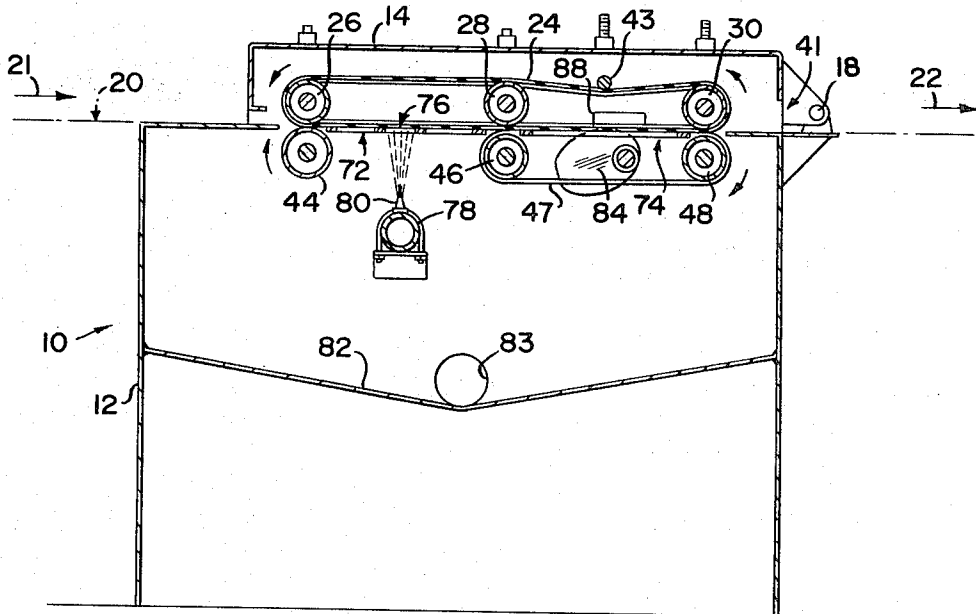
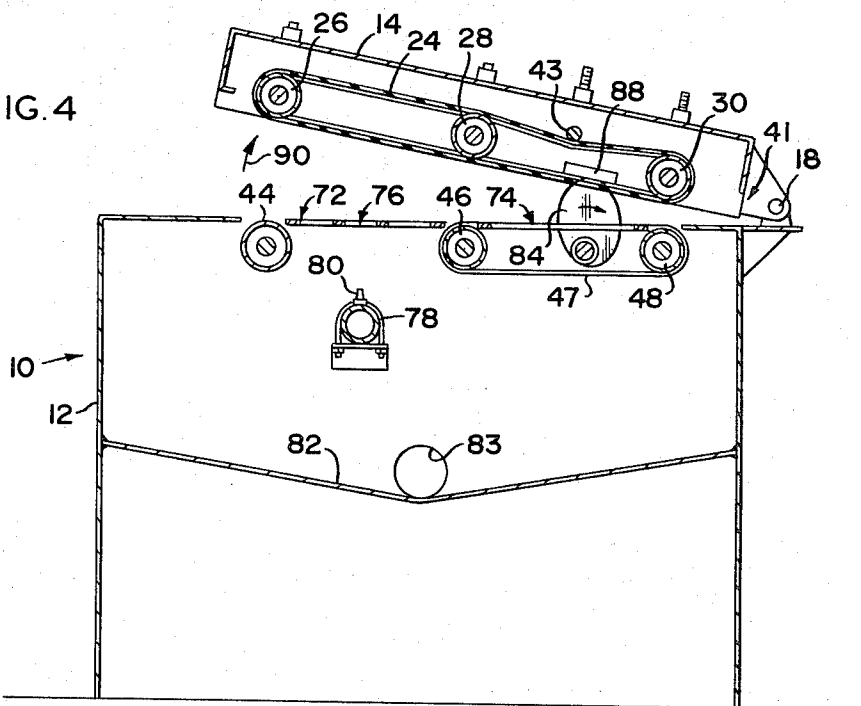


FIG. 4



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CLEANING MACHINE

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to a washing machine for cleaning vinyl back mats, rugs or the like through the use of a high-powered liquid spray impinging upon the mats as they are conveyed through the machine.

2. Description of the Prior Art

A number of machines are presently on the market which are primarily designed for the washing or cleaning of mats, rugs and the like. These machines generally comprise means to convey the mats through the machine past a point where the actual cleaning takes place. Cleaning usually occurs by providing a scrubbing action to the rug surface by means of a plurality of brushes or by directing a high-powered spray of liquid onto the rug.

In utilizing both of these methods, conventional rug cleaning machines encounter the problem of "hang up" of the rug as it passes through the machine. Hang up is generally considered a more common occurrence when the rugs are being cleaned by a scrubbing action, however, hang up also frequently occurs with conventional spray type cleaning machines. Hang up occurs when the rug becomes folded back upon itself and entangled in the interior of the machine. In the cleaning industry, this is a common occurrence in that the mats are generally flexible. This flexibility is the primary cause of hang-up and when it does occur it is often necessary to destroy the rug. This is true in conventional machine because the only way to unclog the workings of these machines is to cut the rug free. This of course results in great expense to the cleaning industry and the operators of these machines due to downtime of the machine while the rug is being cut free. Additional expense obviously incurred due to the replacement cost of the rug when it is destroyed.

This problem of hang up is most prevalent when cleaning rubber back or similar vinyl back mats. None of the presently known machines which are designed to clean this type of mat have solved the hang up problem while at the same time providing an efficient, rapid and inexpensive means of cleaning.

In an attempt to overcome the hang up problem, while maintaining an efficient cleaning operation, a number of the conventional machines have been designed with elaborate conveyor systems which are intended to convey the mat through the machine in such a manner as to prevent hang up. These machines are of course much more expensive due to the added complexity which results in added costs to the customer having his mats cleaned. These more complex machines are usually more subject to breakdown thereby providing additional maintenance problems.

SUMMARY OF THE INVENTION

The present invention relates to a machine for cleaning rugs and particularly vinyl back mats in a manner which will eliminate the problem of "hang up." The machine comprises a tank having a top mounted thereon. The top is pivotally connected to the tank so that the tank interior is readily accessible upon lifting the top from the tank. This specific structural feature eliminates the primary disadvantage when hang up occurs in a rug cleaning machine. Namely, upon the occurrence of hang up, the rug then in the machine is eas-

ily removed without its destruction by merely separating the top from the tank. Separation may be accomplished manually through the operation of a lever and cam arrangement. The cam is fixedly attached to the lever and rotatably mounted on the tank. The cam is positioned in cooperative relation to a cam rider which is mounted on the top. Rotation of the cam by movement of the lever causes the cam to movably engage the cam rider thereby forcing the top to separate from the tank.

The rug or mat is transported through the machine by a conveyor means comprising an endless belt movably mounted within the top of the machine. The belt is supported therein by a plurality of belt support rollers arranged in spaced relation to one another and also rotatably mounted within the top of the machine. The two rollers located at each end of the endless belt may be spring mounted to supply proper amounts of pressure to mats or rugs entering and leaving the machine.

The conveyor means further comprises a plurality of conveyor rollers rotatably mounted in the tank of the machine. A plurality of endless strip belts are mounted about the last two of these conveyor rollers. The conveyor rollers and cooperating strip belts are arranged in opposed relation to the endless belt so as to define the path of travel of a mat traveling through the machine between the top and tank of the machine. The conveyor rollers are interconnected to one another by means of a plurality of chains connected to cooperating sprockets mounted on the extremities of each of the rollers. An electric motor or like power source serves to drive each of the conveyor rollers through the chains and sprocket arrangement. The endless belt comprises two intermeshing spur gears which are connected to at least one conveyor roller and at least correspondingly positioned belt support roller respectively. Driving of this conveyor roller causes the associated belt support roller to also be driven, thereby causing the endless conveyor belt to rotate.

At least one grate is positioned between successive pairs of conveyor rollers. The grate or grates positioned between the last two conveyor rollers are arranged on the interior of the strip belts such that the belts travel around these grates. These grates are mounted in the tank and positioned to support the rug or mat as it is transported through the machine by the endless belt, conveyor rollers and the plurality of strip belts supported on the last of these conveyor rollers. At least one of the grates has an elongated slot which extends across the width of the path of travel of the mat as it passes through the machine. This slot is aligned with a spray pipe located in the tank beneath the grates. A plurality of nozzles are arranged on the spray pipe so as to direct a plurality of jets of liquid through the slot and onto the mats. The jets of liquid provide the cleaning action for the mat as it is transported through the machine.

The last of the conveyor rollers and the last belt support roller are mounted in cooperating relation so as to squeeze excess water from the mat or rug as it passes from the machine. Proper drainage means is also arranged within the tank and serves to remove only excess water remaining in the tank.

The machine of this invention, having the structural features outlined above, provides an efficient means of cleaning rugs and especially rubber or vinyl back mats in a manner which eliminates the problems encoun-

tered because of hang up. Through the use of this machine, hang up is greatly reduced primarily because of the manner in which the mat is conveyed through the machine. However, when hang up does occur the rug may be quickly and easily removed from the machine, without cutting the rug or otherwise destroying it. Removal of the rug is accomplished by merely rotating the lever and connected cam into moving engagement with the cam rider thereby forcing the top portion to separate from the tank of the machine. As explained above, this provides ready access to the interior of the machine and accordingly any rug being cleaned therein.

The invention accordingly comprises the features of construction, combination of elements, and arrangements of parts which will be exemplified in the construction hereinafter set forth, and the scope of the invention will be indicated in the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

For a fuller understanding of the nature and objects of the invention, reference should be had to the following detailed description taken in connection with the accompanying drawings in which:

FIG. 1 is a top cutaway view of the cleaning machine of the present invention.

FIG. 2 is a side view of the cleaning machine.

FIG. 3 is a side sectional view showing the top section of the cleaning machine in closed position relative to the tank.

FIG. 4 is a side sectional view of the cleaning machine showing the top section in an opened or separated position relative to the tank.

Similar reference characters refer to similar parts throughout the several views of the drawings.

DETAILED DESCRIPTION

FIGS. 1 and 2 show a cutaway top view and a side view respectively of the cleaning machine generally indicated as 10. The machine comprises a tank 12 and a top 14. The top is pivotally attached to tank 14 by means of a pair of hinges 16 and 18. A mat or rug 20 indicated in dotted lines is designed to pass through the machine between tank 12 and top 14 as shown by directional arrows 21 and 22.

The mat 20 is transported through the machine by a conveyor means comprising an endless belt 24. The belt 24 is movably mounted within top section 14 by means of a plurality of belt support rollers 26, 28 and 30. Each of these support rollers are rotatably mounted within top section 14 and serve to support the belt in engagement with a mat 20 as it passes through the machine. A plurality of bearing housings 32, 34 and 36 serve to rotatably mount the support rollers 26, 28 and 30 respectively in top section 14. Each of these bearing housings are spring loaded by means of coil springs 38, 40 and 42 attached to housings 32, 34 and 36 respectively. This spring loading has the effect of putting the desired pressure on the mat as it passes through the machine. This pressure is important for the proper entrance of the mat into the machine to thereby reduce the probability of hang up of the mat occurring in the machine. It is also important to have the proper amount of pressure as the mat exits the machine as at 41 so that any excess water and detergent will be squeezed from the mat. The pressure exerted on the mat as it exits the machine is also necessary to maintain the proper tension on the mat as it travels through the machine

thereby tending to reduce the occurrence of hang up. A tensioning bar 43 is also provided and adjustably connected to the top portion 12. Bar 43 engages belt 24 and thereby maintains proper tension on belt 24 during its operation.

The conveyor means further comprises a plurality of conveyor rollers rotatably mounted in the tank portion 12 of the machine. The conveyor rollers 44, 46 and 48 are arranged in opposed relation to the belt 24 so as to define the path of travel of the mat between tank 12 and top 14. This path is further defined by a plurality of endless conveyor strip belts 45 and 47 mounted about the last two conveyor rollers 46 and 48, and driven thereby. These strip belts each have a much thinner width than endless belt 24, and are an important feature preventing hang up. Power to drive the conveyor roll is supplied from a driving means comprising a motor 50 which may be a standard electric motor. The power take off of the motor is connected by means of chain 52 to a main sprocket gear 54 which in turn is attached to conveyor roller 44. Endless chain 56 interconnects conveyor rollers 44 and 46 by means of sprocket gears 58 and 60 connected thereto respectively. Similarly, conveyor rollers 46 and 48 are interconnected by chain 62 between sprocket gears 64 and 66 attached to rollers 46 and 48 respectively. Consequently, it can be seen that each of the conveyor rollers 44, 46 and 48 are driven by motor 50. The conveyor belt 24 is driven by means of spur gear 68 connected to roller 30. Gear 68 is positioned to engage a second spur gear 70 which is attached to correspondingly located conveyor roller 48. In that conveyor roller 48 is interconnected in driven relation to the remaining conveyor rollers 44 and 46, support roller 30 is thereby driven due to the intermeshing of driven and driving gears 68 and 70 respectively.

As shown in FIG. 1 grates 72 and 74 are placed between each of the conveyor rollers 44, 46 and 48 respectively. These grates are so positioned to allow the mat 20 to travel thereover by the cooperative rotational movement of belt 24 and each of the conveyor rollers along with belts 45 and 47. Grate 72 has provided therein a longitudinally extending slot 76 positioned in the approximate center of the grate and extending across the entire width of the path of travel of mat 20.

Cleaning action of the mat 20 occurs by means of a plurality of spray jets of liquid issuing from spray pipe 78. The jets are formed by a plurality of knife nozzles 80 communicating with the interior of spray pipe 78. Each of the knife nozzles are aligned with slot 76 so as to direct the jet onto a mat 20 through the slot without breaking up the jet and thereby providing a more efficient cleaning action.

Drainage of water and detergent from tank 12 occurs by means of a V-shaped base 82 formed within tank 12 (FIGS. 3 & 4). At the bottom of this base is located a drainage pipe 83 through which excess liquid exits tank 12.

FIGS. 3 and 4 show means to separate top section 14 from tank 12 and thereby provide ready access to the interior of the machine. The top section 14 is lifted and pivoted about the hinges 16 and 18 by means of a raising means comprising at least one cam means 84 rotatably mounted on tank 12 and fixedly attached to lever 86. A cam rider 88 is fixedly attached to the top portion 14 and positioned to cooperatively engage cam 84

when lever 86 is rotated. As the cam 84 movably engages rider 88 the top section 14 moves relative to tank 12 as it pivots around hinges 16 and 18 as shown by directional arrow 90. For simplicity of operation in providing quick and ready access to the interior of the machine, top section 14 is light enough to allow lever 86 to be manually operated. As stated above a mat or rug in which hang up has occurred can thereby be easily removed from the interior of the machine without it being cut or destroyed.

It will thus be seen that the objects made apparent from the preceding description are efficiently attained and, since certain changes may be made in the above construction without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

Now that the invention has been described,

What is claimed is:

1. A cleaning machine of the type designed to clean mats, said machine comprising: a tank, a top movably connected to said tank, conveyor means arranged to convey said mat through said machine and comprising an endless belt movably mounted within said top, a plurality of conveyor rollers mounted in said tank in opposed working relation to said belt, at least one strip belt mounted within said tank on at least two of said conveyor rollers, whereby said endless belt, said conveyor rollers and said strip belt at least partially define a path of travel of the mat through said machine; driving means disposed on said machine to drive said conveyor means, raising means connected to said tank and arranged relative to both said tank and said top and comprising a cam rotatably mounted on said tank, a cam rider attached to said top, said cam and said rider

arranged in cooperative relation such that rotation of said cam causes separation of said belt from said plurality of conveyor rollers, whereby the interior of said machine is accessible upon separation of said top from said tank.

2. A cleaning machine as in claim 1 wherein said endless belt is mounted in said top of said machine, said plurality of conveyor rollers mounted in successive spaced relation to one another on said tank, said endless belt and said plurality of conveyor rollers and cooperating strip belt are arranged in opposed working relation to one another so as to define the path of travel of the mat between said top and said tank.

3. A cleaning machine as in claim 1 wherein said belt is mounted within said machine by means of a plurality of endless belt support rollers arranged in supporting engagement to said endless belt, at least one of said endless belt support rollers arranged in driven engagement with said driving means, whereby said endless belt travels about said support rollers.

4. A cleaning machine as in claim 3 wherein each of said conveyor rollers is connected in driven relation to said driving means; at least one of said driven conveyor rollers connected to at least one of said support rollers in driving relation such that said endless belt and said conveyor rollers are simultaneously driven upon activation of said driving means.

5. A cleaning machine as in claim 3 wherein each of said conveyor rollers is connected in driven relation to said driving means; a first gear means attached to at least one of said support rollers, said first gear means arranged relative to said second gear means such that said second gear means is driven by said first gear means upon activation of said driving means, whereby said belt and said conveyor rollers rotate.

6. A cleaning machine as in claim 1 further comprising grate means mounted within said tank between two of said conveyor rollers, and arranged in supporting relation to said mat as it travels through said machine.

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