Dec. 16, 1941. J. C. ENDEBROCK, JR 2,266,490

CLEANING MACHINE

Filed Sept. 10, 1938 2 Sheets-Sheet 1

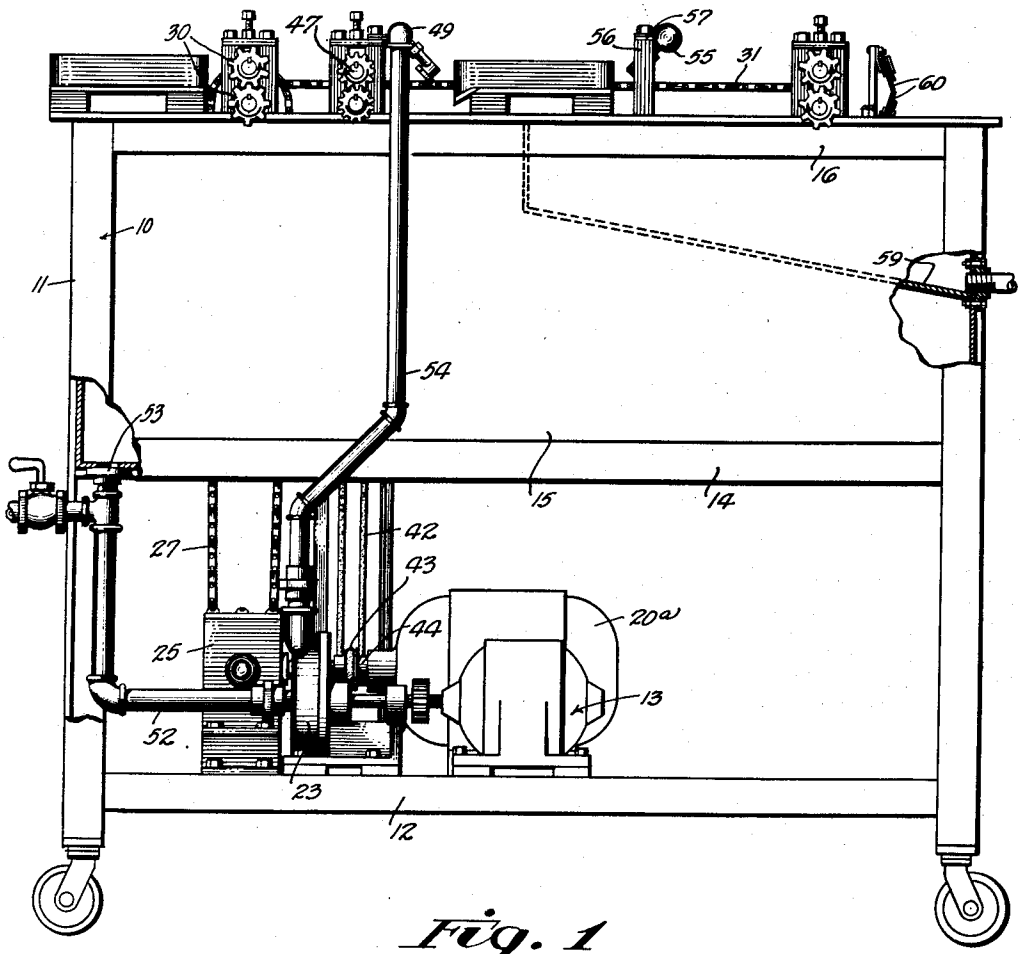


Fig. 1

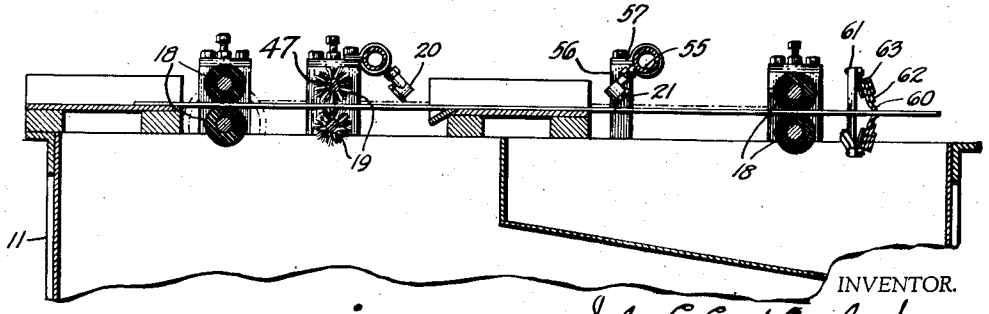


Fig. 3

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Wood & Wood

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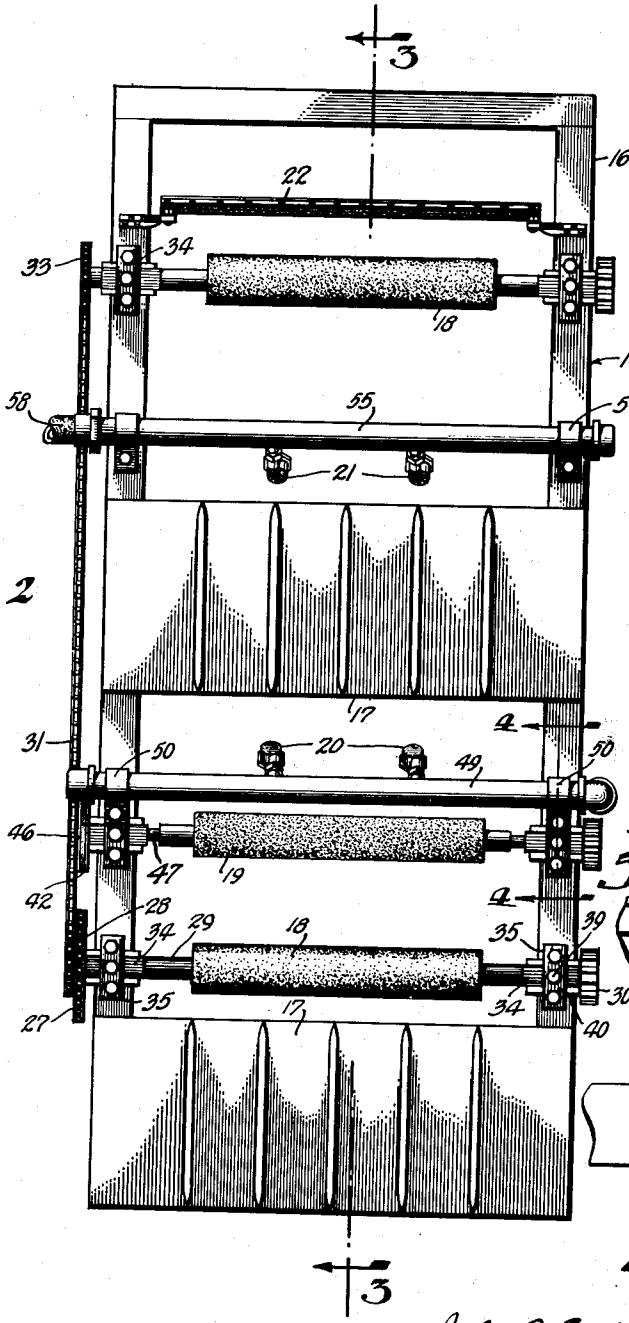


Fig. 2

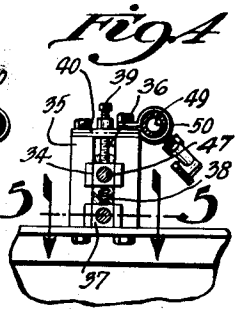


Fig. 4

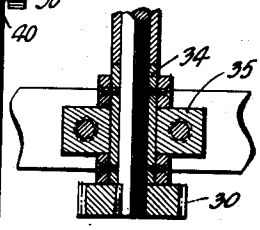


Fig. 5

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UNITED STATES PATENT OFFICE

2,266,490

CLEANING MACHINE

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Application September 10, 1938, Serial No. 229,313

1 Claim. (Cl. 15—4)

This invention relates to machines for use in cleaning Venetian blinds. More specifically, the present invention is directed to a power driven machine designed particularly for cleaning Venetian blind slats or other similar flat strips carrying a delicate finish.

By reason of the flow of air through Venetian blinds, the slats, after a time, become coated with a film of dirt usually composed of carbonaceous dust such as the soot and fly ash which is present in the atmosphere. The blinds, therefore, require periodic cleaning and, for this purpose, are taken down and the slats are removed for individual treatment. The common practice has been to cleanse the slats by hand with soap and water and scrubbing.

The blind slats are usually of thin, fragile wood finished in light colors. The finish is applied very lightly in order to avoid cracking or checking of the paint due to the flexing of the slats. Because of its composition, the dirt which accumulates is very adherent and difficult to remove. Considerable scrubbing is required, otherwise the finished slat may remain spotted or speckled. On the other hand, care must be exercised to avoid excessive scrubbing with resulting damage to the delicate finish. Furthermore, due to the thinness of the wood, the work must be performed quickly and the slats dried immediately thereafter, to prevent absorption of moisture and warping of the slats.

In large establishments equipped with Venetian blinds, such as office and apartment buildings, periodic cleaning of the slats is an item of considerable expense. It is principally for this service that the present cleaning machine is intended.

Briefly, the objective of the present invention has been to provide a machine which is capable of cleansing the slats thoroughly so that all the dirt is removed from them, but without abrasion of the surface and yet in so short a period of time that the wood is not dampened nor the finish impaired.

A further objective has been to provide a machine for successively cleaning, rinsing and drying the slats so that they may be ready for reinstallation into the blind assembly without further drying.

Further objects and advantages of the invention will be more fully set forth in the specification with reference to the accompanying drawings in which:

Figure 1 is a side elevation of the machine.

Figure 2 is a top plan view of the same.

Figure 3 is a sectional view taken on line 3—3 of Figure 2.

Figure 4 is a detailed view taken on line 4—4 of Figure 2.

Figure 5 is an enlarged sectional view taken on line 5—5 of Figure 4 detailing one of the bearing assemblies.

Briefly, the present invention is based upon the employment of a means for wetting the slats with washing or detergent solution, and next upon the employment of brushes for wiping the dirt along the slat progressively until the slat is discharged. A rinsing mechanism operates in conjunction with a wiper that withholds the surface water as the slat is passed through the machine, and all of the parts are related to one another so that all of the operations are performed in lineal direction of the slat itself. In this manner the scratches which are apt to be caused through physical removal of accumulated soot and fly ash are confined to the linear direction of the slat, in other words, with the grain, and the appearance of the finish is not impaired.

The wiping action upon the mild abrasive of dirt avoids noticeable scratches and the slats acquire a rubbed, finished appearance. The wiping brushes rotate at a definite speed relative to the linear movement of the slats and at a predetermined pressure. Therefore the machine cleanses the slats with a minimum of scrubbing, so that damage to the finish is substantially eliminated. The machine can be operated by an unskilled person and the slats cleaned in large quantities at a high rate of speed.

Referring specifically to the drawings illustrating the preferred embodiment of the invention, the frame of the machine is indicated generally at 10. The frame is made up preferably of angle iron sections constituting vertical corner members 11 tied together by means of side and end rails. The lowermost set of side and end rails 12 serves as a support for the drive assembly and pump equipment indicated generally at 13. The intermediate rails 14 support the tank or reservoir 15 containing the cleaning solution, and the uppermost rails 16 support the cleaning apparatus.

The cleaning apparatus consists essentially of the following parts; a pair of support or guide members 17 for the slats, feed rollers 18 for translating the slats longitudinally through the machine, a pair of rotary scrubbing brushes 19, spray heads or nozzles 20 and 21 for the cleaning solution and rinsing water respectively, and a

squeegee 22 for removing the water from the slats as they emerge from the machine.

Described in general, the operation of the machine is as follows: a quantity of cleaning solution such as a mixture of soap and water is contained in the tank 15; the solution is circulated by means of a pump 23 and is sprayed upon the slats and brushes 19 through the nozzles 20; the solution, of course, drops back into the reservoir to be recirculated after leaving the brushes. After passing between the brushes, the slats pass beneath a spray of rinse water to remove the remainder of the soap solution and, from this point, immediately pass between the squeegees 60 where the slats are dried. Since the slats move through the machine at a fairly high rate of speed, they are moistened only for a brief time and the moisture has no opportunity to penetrate the fibers of the wood and cause warping of the slats.

The slats are treated several at a time. In the present embodiment, the machine is equipped to receive four slats simultaneously. The pressure of the wiping brushes may be varied by means of adjusting screws so that the machine may be set up with proper pressure to effectively clean each slat to a uniform degree without damaging the finish of the slats.

The feed rollers 18 and the rotary brushes 19 are driven from a motor 20a at the base of the machine. The brushes are driven by means of a belt directly from the motor, while the feed rollers are driven at a reduced speed through a speed reducing unit 25 in driving connection with the motor 20a. The drive takes place through a sprocket chain 27 in mesh with a sprocket (not shown) of the speed reducer and with a sprocket 28 secured upon the shaft 29 of the upper roll of the forward set of feed rollers. The opposite ends of the feed roll shafts are provided with gears 30 meshed to transmit the drive from the upper to the lower roll. A second set of rollers identical with the first is mounted toward the rear end of the machine. This set of rolls is driven from the forward set by means of a sprocket chain 31 in mesh with a sprocket 33 on the rearward set. Each set of feed rolls is journaled in bearing blocks 34 secured in guide members 35 mounted on the top rail of the machine. The guide members provide a slot 36 in which the respective bearing blocks of the upper rollers of each slot are slidably sustained. The lower bearing block 37 of each lower roller is fixed in the guideway against vertical motion.

A compression coil spring 38 is disposed between the upper and lower blocks of each bearing assembly. A set screw 39 is screw threaded through a cross member 40 at the top of the respective guide members. These set screws 39 are in contact with the respective upper bearing blocks to permit vertical adjustment of the upper rolls. By means of these set screws in conjunction with the springs 38, the pressure of the rolls may be varied to accommodate operating conditions, for example, to change the setting of the rolls to accommodate various thicknesses of slats or to adjust the rolls for wear.

The feed rolls are formed of yieldable material preferably of soft rubber. This prevents marring of the finish of the slats and also provides a better frictional engagement in feeding the work.

The rotary brushes are mounted in slidable bearings in the same manner as the feed rolls; therefore, a detailed description is omitted. These brushes are provided with a set of gears in the same manner as the feed rolls. The brushes rotate at a relatively high speed and in a direction opposite to the lineal feeding movement of the slats to propel the dirt along the slat until it is discharged from the end. The brushes are driven directly from the motor 20a by means of a belt 42 and a pulley 43 secured on the motor shaft 44. The belt 42 is carried over a pair of idler pulleys (not shown), mounted adjacent to the motor, to a pulley 46 secured on the upper brush shaft 47. By means of the drive arrangement, the peripheral speed of the brushes greatly exceeds the rate of lineal movement of the slats. For example, the peripheral brush movement may equal thirty-five or forty times the rate of slat movement.

The slats are guided and sustained by the plates 17, one at the receiving end of the machine and the other located intermediate the sets of feed rollers. The guide plates include a series of vertical baffles or guides adapted to confine the slats to a definite parallel path of movement between the rolls and brushes of the machine.

As previously indicated, the slats are washed in a cleansing solution preferably of soap and water. The solution is sprayed upon the brushes and slats through the spray heads 20 located somewhat above the plane of the slats adjacent to the brushes. It will be noted in Figure 3 that these nozzles are located to the rear of the brushes and arranged to direct the spray of cleaning solution upon the slats in the area closely adjacent to the brushes. The brushes rotate in a direction to carry the liquid toward the forward end of the machine away from the cleaned portions of the slats. The liquid, which is expelled with considerable velocity, impinges upon the merging section of the slats and is deflected into the brushes and carried through, thus flooding the uncleaned area of the slats. In this manner, the dirty solution is constantly carried away from the cleaned portion of the slats and somewhat loosens the dirt on the uncleaned portions before the brushes are reached.

The spray heads or nozzles 20 are mounted upon a manifold pipe 49 extending across the machine and secured by means of clips 50 to the guide members upon opposite sides of the machine. The soap solution contained in the tank is conveyed to the manifold pipe by means of the fluid pump 23 at the base of the machine. The pump is driven by the motor 13 mounted on the base of the machine adjacent to the pump. The pump is connected to the tank by means of a conduit or pipe 52 in communication with the bottom of the tank as at 53. The liquid is supplied to the manifold pipe under pressure by means of a pipe 54 connected to the pump at its lower end and at its upper end in communication with the manifold pipe 49. Since the nozzles are located above the open tank the cleaning solution drains directly from the slats and brushes back into the tank to be recirculated.

The second set of nozzles provides a spray of clear water for rinsing the cleaning solution from the slats after they leave the brushes. These nozzles are mounted on a manifold pipe 55, mounted on a pair of support blocks 56 secured on opposite sides of the machine. The pipe is held in place by means of mounting clips 57 similar to the mounting clips supporting the previously described manifold pipe.

The manifold pipe 55 is connected to a water supply line 58. A drainage trough 59 is provided

at the rearward end of the machine to catch the water as it drains from the slats. The trough is inclined toward the rear of the machine and includes a drainage pipe to conduct the water to a point of disposal.

The slats are dried by means of a pair of squeegees 60—60 located at the rear end of the machine. The slats pass between the squeegees as they leave the last set of feed rollers. The squeegees are made up preferably of oppositely disposed strips of rubber inclined slightly at an angle to each other. The squeegees are mounted upon support members 61—61 at opposite sides of the machine. In order to stiffen the squeegee elements, an additional strip of rubber or other stiffening material, as indicated at 62, may be applied. The squeegees are secured between metal strips indicated at 63, the opposite ends of which are bolted to the support members 61.

As the slats pass under the rinsing nozzles the force of the water effectively cleanses them of the cleaning solution and as they emerge from the machine, the squeegees remove this water so that the slats are in a moist condition for only a very short time, thus preventing any warping of the wood.

For a thorough cleansing action it is preferable to run the slats through the machine twice. As the slats emerge from the rear of the machine after the first treatment they are turned over and given the second treatment, thus insuring a thorough cleansing.

The machine may be provided with an upper and lower set of nozzles if desired. If arranged in this manner, both sides of the slats are cleaned simultaneously and it is unnecessary to run the slats through the machine a second time.

Having described my invention, I claim:

A machine for cleaning slats for Venetian blinds and the like, which is comprised of a pair of driven rolls mounted in cooperating relationship for driving a slat therethrough, a pair of brushes for brushing opposite surfaces of the slat, spray means for applying cleansing fluid to the surface of the slat, separate spray means in spaced relationship therefrom for applying rinsing water to the slat after it has been brushed, a table including means for supporting and guiding the slat in a straight line longitudinally of the machine intermediate the said separated spray means, and a pair of squeegees mounted for contacting opposite sides of the slat to wipe the rinsing water from the surfaces thereof so that the portions of the slat beyond the squeegees are in substantially dry condition.

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