Dec. 17, 1957 C. A. PETERSON 2,816,304

VENETIAN BLIND CLEANING MACHINES

Filed Dec. 7, 1954 2 Sheets-Sheet 1

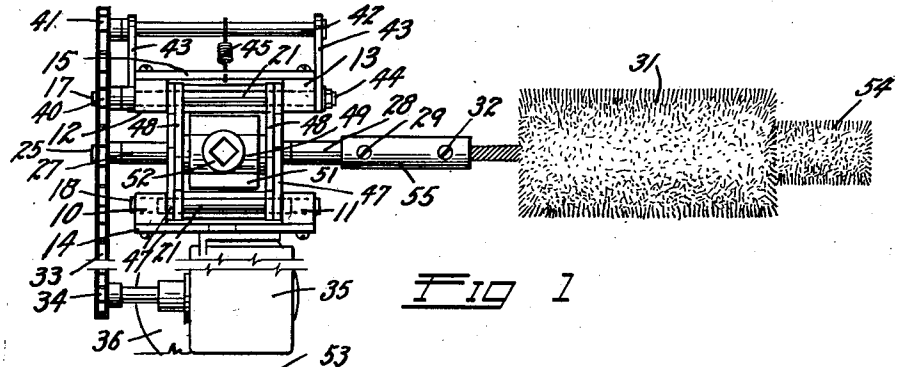


FIG 1

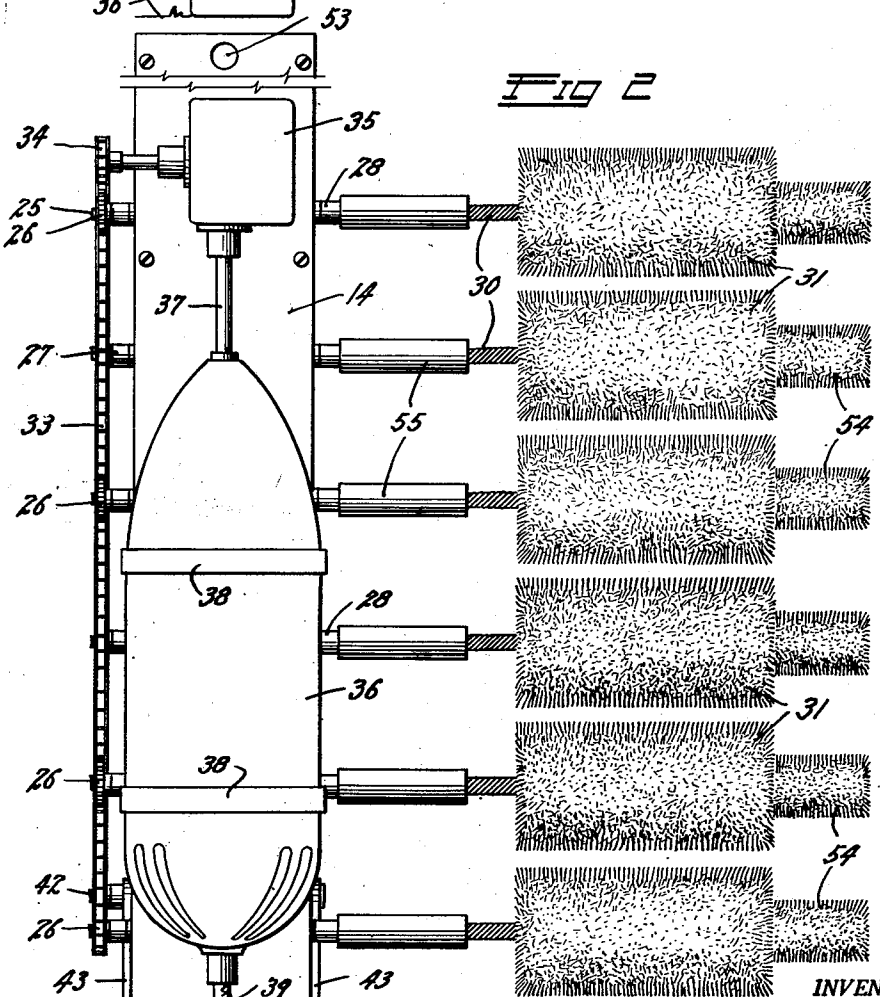


FIG 2

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VENETIAN BLIND CLEANING MACHINES

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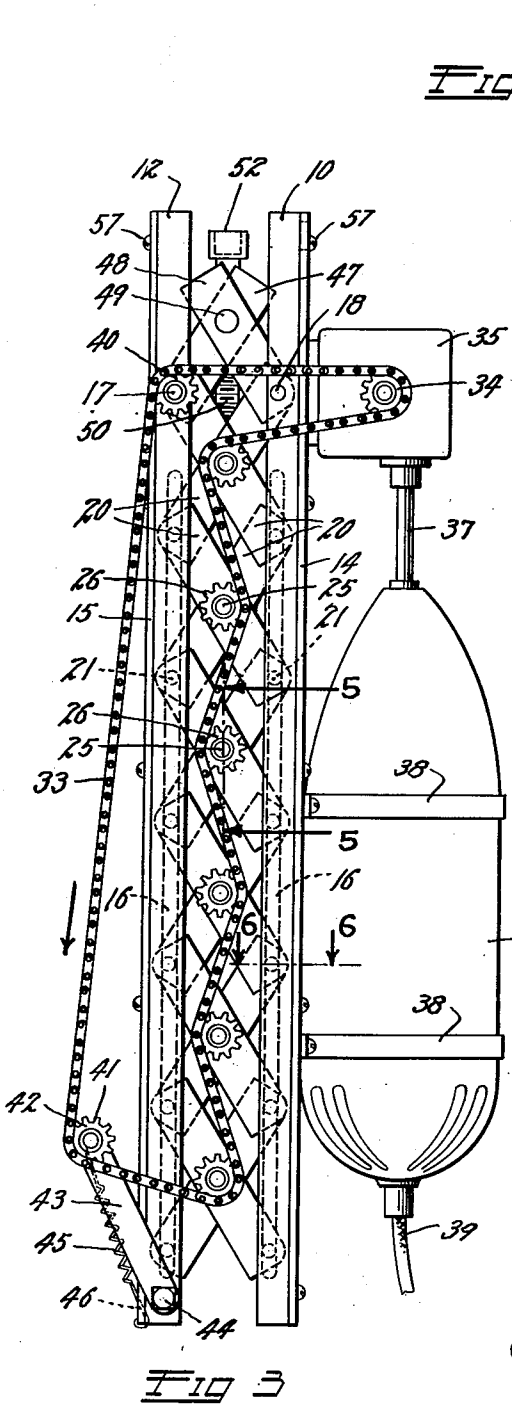


FIG 3

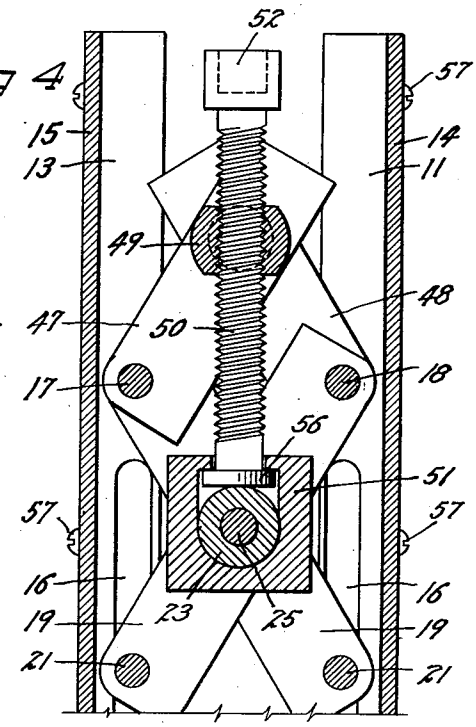


FIG 4

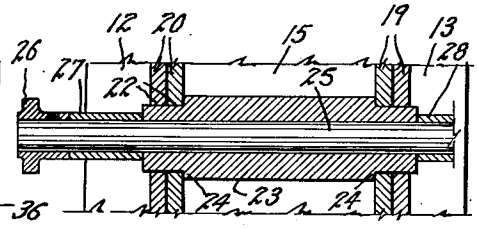


FIG 5

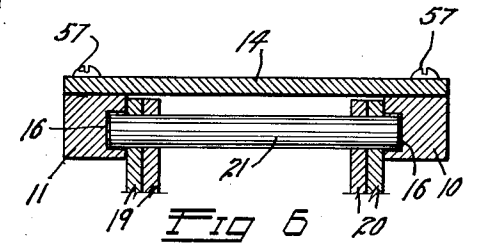


FIG 6

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VENETIAN BLIND CLEANING MACHINES

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Application December 7, 1954, Serial No. 473,547

7 Claims. (Cl. 15—23)

This invention relates to a Venetian blind cleaning machine and has for its principal object the provision of a motor-driven multiple brush device which will brush both sides of a plurality of Venetian blind slats simultaneously, and which can be quickly and easily adjusted to accommodate the various slat spacings found in different makes of Venetian blinds.

Another object is to provide a multiple brush Venetian blind cleaning device in which the adjacent brushes will be power driven in opposite directions so that the rotation of the brushes on the opposite sides of the blind slat will counteract each others tractive efforts so that they will not act to force the slats of the blinds in either direction, and to so arrange the brush driving mechanism that the spacing of the brushes can be varied without affecting the transmission of power.

A further object is to provide a Venetian blind cleaning brush which can be used for cleaning both the open portions of the slats and the portions between the supporting tapes and cords of the slats.

Other objects and advantages reside in the detail construction of the invention, which is designed for simplicity, economy and efficiency. These will become more apparent from the following description.

In the following detailed description of the invention, reference is had to the accompanying drawing which forms a part hereof. Like numerals refer to like parts in all views of the drawing and throughout the description.

In the drawing:

Fig. 1 is a top view of the improved Venetian blind cleaning machine.

Fig. 2 is a side view thereof;

Fig. 3 is an outer end view thereof;

Fig. 4 is an enlarged fragmentary, longitudinal section through the upper extremity of the improved machine; and

Figs. 5 and 6 are similarly enlarged, fragmentary, cross-sections, taken on the lines 5—5 and 6—6, respectively, Fig. 3.

Broadly speaking, the device comprises an elongated vertical framework supporting a plurality of vertically-spaced parallel shafts, each shaft being provided with a rotary brush adapted to be passed between the slats of a Venetian blind to simultaneously clean both sides of each of a number of slats.

The framework comprises four vertical, parallel bars arranged in rectangular arrangement. Two of the bars, designated on the drawing by the numerals **10** and **12**, will be herein referred to as the front frame bars, and the remaining two of the bars, designated by the numerals **11** and **13**, will be herein referred to as the rear frame bars. The frame bars **10** and **11** are rigidly secured together in parallel relation by means of a right side plate **14**, and the bars **12** and **13** are similarly secured together by means of a left side plate **15**. The plates **14** and **15** may be secured to the upright bars in any desired manner such as by means of suitable screws **57**.

The frame bars are all similar in structure, and each is provided with a longitudinally extending guide groove **16**, the grooves of the bars **10** and **11** are faced toward each other, as are the grooves of the bars **12** and **13**. An idler shaft **17** extends between and through the frame bars **12** and **13** adjacent the upper extremities thereof, and a hinge shaft **18** extends between and through the frame bars **10** and **11** adjacent their upper extremities.

A continuous series of lazy tong bars **19** are suspended from the shafts **17** and **18** adjacent the frame bars **11** and **13**, and a similar continuous series of lazy tong bars **20** are suspended from these shafts adjacent the frame bars **10** and **12**. The lazy tong bars are all similar and are pivoted together in pairs at their extremities by means pivot shafts **21** which extend through the overlapping extremities of the lazy tong bars **19**, thence through the overlapping extremities of the lazy tong bars **20** and project beyond both the bars **19** and **20** into slidable engagement with the grooves **16**.

At the points where the bars of the pairs of lazy tong bars intersect each other, bushing openings **22** are formed in the bars to receive the extremities of a brush shaft bearing bushing **23**. The extremities of each bushing **23**, where they pass through the openings **22**, are reduced in diameter so as to form spacing shoulders **24** on the bushings which act to maintain them in place between the two series of lazy tong bars **19** and **20**.

A brush shaft **25** is journalled in and extends through each of the bushings **23**. The brush shafts **25** project rearwardly from the series of lazy tong bars **19** and terminate in sprockets **26**. The sprockets **26** are maintained in accurate, spaced relation with the bushings **23** by means of tubular spacing sleeves **27** surrounding the shafts **25**. The brush shafts **25** also project forwardly from the bushings **23** and terminate in tubular brush socket sleeves **55** which are secured on the extremities of the brush shafts **25** by means of suitable set screws **29**. The brush socket sleeves **27** are maintained in accurate spaced relation to the bushings **23** by means of suitable tubular spacers **28**.

The brush socket sleeves **55** are designed to receive the shanks **30** of elongated cylindrical bristle brushes **31**, the shanks being secured in the socket sleeves **55** by means of suitable set screws **32**. The brushes are preferably, but not necessarily, of the type formed by bristles clamped between the turns of a double twisted wire shaft.

The sprockets **26** are driven in opposite directions by means of an endless sprocket chain **33** which is driven from a drive sprocket **34**. The drive sprocket **34** is rotated through the medium of suitable speed-reducing gears contained within a speed reducer housing **35** which is mounted on the right side plate **14**. The speed reducer mechanism is driven from a suitable electric motor **36** also mounted on the right side plate **14** in any desired manner, such as by means of suitable clamping bands **38**. The shaft of the motor, indicated at **37** extends to and drives the gears in the speed reducer housing **35**. The motor is supplied with current through the usual electrical conductor cord **39**.

A first idler sprocket **40** is rotatably mounted on the idler shaft **17** and a second idler sprocket **41** is mounted on a movable idler shaft **42**. The movable idler shaft **42** is journalled between the extremities of two idler arms **43** which are hingedly mounted on a hinge bolt **44** which extends through and between the two frame bars **12** and **13** at their lower extremities. The movable idler shaft **42** is constantly urged downwardly by means of a suitable tension spring **45** which extends between the shaft **42** and a spring-receiving opening **46** in the bottom of the left side plate **15**.

The transmission chain **33** is trained from the drive sprocket **34** around the first idler sprocket **40**, downwardly around the second idler sprocket **41**, sidewardly around

the lowermost sprocket 26, thence upwardly into engagement with each of the remaining sprockets 26, in zig-zag arrangement, so that each sprocket 26 will hold the chain 33 in meshing engagement with the two adjacent sprockets 26. From the uppermost sprocket 26 the chain extends to and around the drive sprocket 34.

It can be seen that if the chain 33 is traveling in the direction of the arrow in Fig. 3, it will rotate the lowermost sprocket 26 and each alternate sprocket above the lowermost sprocket 26 in a counterclockwise direction, and will correspondingly rotate the intermediate sprockets 26 in a clockwise direction.

In order to make the device adaptable to Venetian blinds of various slat spacings, it is only necessary to either move the brush shafts 25 toward or away from each other to provide any desired spacing of the brush shafts 25. This will act through the lazy tong bars to cause the frame bars 10 and 11 to move toward or away from the frame bars 12 and 13. The spacing movement may be initiated in any desired manner.

As illustrated in the drawing, the spacing movement is accomplished by means of a threaded jack screw 50 which is threaded through an elongated nut member 49. The nut member 49 is pivotally mounted between the crossed upper extremities of two pairs of brace bars 47 and 48. The brace bars 47 are hinged at their lower extremities upon the idler shaft 17 and the brace bars 48 are similarly hinged upon the hinge shaft 18. The lower extremity of the jack screw 50 is provided with a terminal flange 56 which is swiveled in a swivel block 51 mounted about the uppermost brush shaft bushing 23. The upper extremity of the jack screw terminates in a wrench receiving head 52 for the reception of any suitable socket wrench device.

It can be seen that the jack screw 50, when rotated, will force the nut member 49 in one direction and the uppermost brush shaft in the opposite direction to cause vertical movement of the latter. This vertical movement is transmitted through the sets of lazy tong bars to all of the brush shafts to cause a corresponding spacing movement therebetween. The brace bars 47 and 48 act to maintain the jack screw central of the framework at all spacings.

As the brush shafts move toward each other, there is a tendency to create a slackening of the chain 33, and as they move away from each other there is a tendency to create a tightening of the chain 33. The chain, however, is maintained under uniform tension at all times by a compensating movement of the second idler shaft 42 under the tension of the spring 45.

While the drawing illustrates six of the brushes 31, it is to be understood that any desired number of brushes may be employed, using exactly the same supporting structure and power transmission mechanism as described. If only a small number of brushes are used, the device would be easily portable and could be manually supported while being run along the width of a conventional Venetian blind while the brushes are rotating under the influence of the motor 36. If a large number of the brushes are built into the machine, it could then be suspended from any suitable suspension device connected through suspension openings 53 in the plates 14 and 15. For washing purposes, means could be mounted on either of the plates 14 and 15 for supplying detergent or rinsing solutions to the rotating brushes.

The machine has been illustrated in its fully expanded position. The diameter of the brushes 31 is preferably such as to substantially equal the widest spacing so that when moved together for closer spacing, the bristles will resiliently flex as they contact the blind slats.

It has been found difficult to clean those portions of the slats which are positioned between the usual suspending ribbons or tapes of a Venetian blind. For cleaning these portions, brush tips 54 of reduced diameter are formed on the brushes. These tips can be forced between

the suspension cords and the suspension tapes of the blinds to clean the portions of the slats therebetween.

While a specific form of the improvement has been described and illustrated herein, it is desired to be understood that the same may be varied, within the scope of the appended claims, without departing from the spirit of the invention.

Having thus described the invention, what is claimed and desired secured by Letters Patent is:

1. A Venetian blind cleaning machine comprising: two upright spaced-apart front bars; two upright spaced-apart rear bars; a first series of crossed pairs of lazy tong bars positioned between the spaced-apart front bars; a second series of crossed pairs of lazy tong bars positioned between the spaced-apart rear bars; attachment means between said lazy tong bars and said upright bars, said attachment means allowing relative vertical movement between said lazy tong bars and said upright bars and preventing relative horizontal movement therebetween; a plurality of horizontal, rotatable brush shafts extending between the two series of lazy tong bars in vertically-spaced relation, said brush shafts extending between points of intersection of the tong bars of one series of tong bars and points of intersection of the tong bars of the other series of tong bars; a brush mounted on one extremity of each brush shaft and extending in horizontal parallel relation to each other; means for adjusting said two series of lazy tong bars vertically to vary the spacing of said brush shafts; and means for simultaneously rotating all of said brush shafts.

2. A Venetian blind cleaning machine comprising: two upright spaced-apart front bars; two upright spaced-apart rear bars; a first series of crossed pairs of lazy tong bars positioned between the spaced-apart front bars; a second series of crossed pairs of lazy tong bars positioned between the spaced-apart rear bars; means anchoring one extremity of each series of lazy tong bars to an adjacent upright bar; a bearing bushing extending between each of the points of intersection of the crossed pairs of bars of one series of crossed lazy tong bars and each of the points of intersection of the crossed pairs of lazy tong bars of the other series of crossed lazy tong bars and forming pivots for the crossed bars; a brush shaft rotatably mounted in each bearing bushing; a brush mounted on the forward extremity of each brush shaft; means for vertically adjusting the other extremity of each series of lazy tong bars to vary the spacing of said brush shafts; and means for simultaneously rotating all of said brush shafts.

3. A Venetian blind cleaning machine comprising: two upright spaced-apart front bars; two upright spaced-apart rear bars; a first series of crossed pairs of lazy tong bars positioned between the spaced-apart front bars; a second series of crossed pairs of lazy tong bars positioned between the spaced-apart rear bars; a bearing bushing extending between each of the points of intersection of the crossed pairs of lazy tong bars of one series of crossed lazy tong bars and each of the points of intersection of the crossed pairs of lazy tong bars of the other series of crossed lazy tong bars forming pivots for the crossed bars; a hinge shaft extending between one of the front bars and one of the rear bars upon which one side of each series is hingedly suspended; an idler shaft similarly extending between the other front bar and the other rear bar upon which the other side of each series is hingedly suspended; a brush shaft rotatably mounted in each bearing bushing; a brush mounted on the forward extremity of each brush shaft; means for adjusting said two series of lazy tong bars vertically to vary the spacing of said brush shafts; and means for simultaneously rotating all of said brush shafts.

4. A Venetian blind cleaning machine comprising: two upright spaced-apart front bars; two upright spaced-apart rear bars; a first series of crossed pairs of lazy tong bars positioned between the spaced-apart front bars; a second series of crossed pairs of lazy tong bars positioned between

the spaced-apart rear bars; a bearing bushing extending between each of the points of intersection of the crossed pairs of lazy tong bars of one series of crossed lazy tong bars and each of the points of intersection of the crossed pairs of lazy tong bars of the other series of crossed lazy tong bars forming pivots for the crossed bars; a hinge shaft extending between one of the front bars and one of the rear bars upon which one side of each series is hingedly suspended; an idler shaft similarly extending between the other front bar and the other rear bar upon which the other side of each series is hingedly suspended; a brush shaft rotatably mounted in each bearing bushing; a brush mounted on the forward extremity of each brush shaft; an idler sprocket mounted on said idler shaft; a brush sprocket mounted on each brush shaft; an endless transmission chain trained around each of said sprockets; means for adjusting said two series of lazy tong bars vertically to vary the spacing of said brush shafts; and means for driving said chain to simultaneously rotate all of said sprockets.

5. A Venetian blind cleaning machine comprising: two upright spaced-apart front bars; two upright spaced-apart rear bars; a first series of crossed pairs of lazy tong bars positioned between the spaced-apart front bars; a second series of crossed pairs of lazy tong bars positioned between the spaced-apart rear bars; a bearing bushing extending between each of the points of intersection of the crossed pairs of lazy tong bars of one series of crossed lazy tong bars and each of the points of intersection of the crossed pairs of lazy tong bars of the other series of crossed lazy tong bars forming pivots for the crossed bars; a hinge shaft extending between one of the front bars and one of the rear bars upon which one side of each series is hingedly suspended; an idler shaft similarly extending between the other front bar and the other rear bar upon which the other side of each series is hingedly suspended; a brush shaft rotatably mounted in each bearing bushing; a brush mounted on the forward extremity of each brush shaft; an idler sprocket mounted on said idler shaft; a brush sprocket mounted on each brush shaft; an endless transmission chain trained around each of said sprockets; a drive mechanism mounted on certain of said upright bars; a drive sprocket driven by said drive mechanism in engagement with said chain for driving the latter; and means for adjusting said two series of lazy tong bars vertically to vary the spacing of said brush shafts.

6. A Venetian blind cleaning machine comprising: two upright spaced-apart front bars; two upright spaced-apart rear bars; a first series of crossed pairs of lazy tong bars positioned between the spaced-apart front bars; a second series of crossed pairs of lazy tong bars positioned between the spaced-apart rear bars; attachment means between said lazy tong bars and said upright bars, said attachment means allowing relative vertical movement between said lazy tong bars and said upright bars and preventing relative horizontal movement therebetween; a plurality of horizontal, rotatable brush shafts extending between the

two series of lazy tong bars in vertically-spaced relation, said brush shafts extending between points of intersection of the tong bars of one series of tong bars and points of intersection of the tong bars of the other series of tong bars; a brush mounted on one extremity of each brush shaft and extending in horizontal parallel relation to each other; means for simultaneously rotating all of said brush shafts; pivot shafts connecting the extremities of both lazy tong bars of each pair of bars of both series of bars to the extremities of both lazy tong bars of the adjacent pair of bars of both series of bars, each pivot shaft projecting outwardly from the bars at both its extremities; longitudinal guide grooves formed in said upright bars in which the outwardly projecting extremities of the pivot shafts are slidably received; and means for moving said pivot shafts in their guide grooves for varying the spacing of said brush shafts.

7. A Venetian blind cleaning machine comprising: two upright spaced-apart front bars; two upright spaced-apart rear bars; a first series of crossed pairs of lazy tong bars positioned between the spaced apart front bars; a second series of crossed pairs of lazy tong bars positioned between the spaced-apart rear bars; attachment means between said lazy tong bars and said upright bars, said attachment means allowing relative vertical movement between said lazy tong bars and said upright bars and preventing relative horizontal movement therebetween; a plurality of horizontal, rotatable brush shafts extending between the two series of lazy tong bars in vertically-spaced relation, said brush shafts extending between points of intersection of the tong bars of one series of tong bars and points of intersection of the tong bars of the other series of tong bars; a brush mounted on one extremity of each brush shaft and extending in horizontal parallel relation to each other; means for simultaneously rotating all of said brush shafts; pivot shafts connecting the extremities of both lazy tong bars of each pair of bars of both series of bars to the extremities of both lazy tong bars of the adjacent pair of bars of both series of bars, each pivot shaft projecting outwardly from the bars at both its extremities; longitudinal guide grooves formed in said upright bars in which the outwardly projecting extremities of the pivot shafts are slidably received; and a jack screw imparting lateral movement to one of said brush shafts to cause said lazy tong bars to simultaneously transmit lateral movement to the remaining brush shafts.

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