



AUTOMATIC MACHINE FOR CLEANING WALLBOARDS

1. Field of the Invention

The present invention relates to an automatic machine that is adapted for cleaning wallboards.

2. Description of the Prior Art(s)

The cleanness of a building's exterior walls can have great influences on people's impression of the building as well as the city's appearance. In particular, since a building with glass curtain walls can be seen-through, whether the glass curtain walls are clean or not is very important. A conventional way that is adapted to clean the exterior walls or outer surfaces of glass windows of the building is hanging a suspended scaffold down from a top of the building to allow workers on the suspended scaffold to clean the exterior walls or the glass windows manually. However, cleaning the exterior walls or the glass windows manually not only consumes manpower and is difficult, but is also very dangerous to the workers on the suspended scaffold.

The main objective of the present invention is to provide an automatic machine for cleaning wallboards that saves manpower when cleaning the wallboards.

The automatic machine for cleaning the wallboards has:

two long axial tracks being separated and being parallel to each other;

at least two sliding engine bases respectively mounted slidably on the long axial tracks, and each sliding engine base driven by a main driving device to slide along a corresponding long axial track;

at least two brush supporting bases respectively mounted movably on



the at least two sliding engine bases, and each brush supporting base driven by a power extending object and selectively moving toward or away from a corresponding sliding engine base; and

at least one long axial brush rotatably mounted around at least one elongated rod and being perpendicular to the long axial tracks, and each of the at least one long axial brush mounted between and sliding along with two of the at least two brush supporting bases that are disposed next to each other and having

an elongated tube having multiple bristles; and

at least one vibrator mounted in the long axial brush.

In the above-mentioned automatic machine for cleaning wallboards, the at least one long axial brush and the at least one elongated rod freely rotate relative to each other.

In the above-mentioned automatic machine for cleaning wallboards, at least two springs are mounted around the at least one elongated rod and are respectively disposed beside ends of the at least one long axial brush.

In the above-mentioned automatic machine for cleaning wallboards, the at least two brush supporting bases are pivotally mounted on the at least two sliding engine bases and are respectively connected to the power extending objects, and each of the power extending objects has a distal end connected to a corresponding sliding engine base. When the power extending objects selectively retract, the at least two brush supporting bases pivot forward and backward relative to the at least two sliding engine bases.

The above-mentioned automatic machine for cleaning wallboards

further has at least one protective cover plate mounted around the at least one long axial brush. Each of the at least one protective cover plate has a partition disposed in the protective cover plate and having multiple through holes separately formed through the partition, and a vent channel defined between an outer wall of the protective cover plate and the partition.

In the above-mentioned automatic machine for cleaning wallboards, each of the long axial tracks has a mounting recess and is securely attached to the wallboard with at least one T-nut fitted in the mounting recess and attached to the wallboard.

In the above-mentioned automatic machine for cleaning wallboards, each of the long axial tracks has multiple recessed tracks, and each of the sliding engine bases has multiple wheels slidably mounted in the recessed tracks of the corresponding long axial track.

In the above-mentioned automatic machine for cleaning wallboards, each of the long axial tracks has an electric rail, and each of the sliding engine bases has a conduction frame corresponding to and electrically connected to the electric rail of the corresponding long axial track.

In the above-mentioned automatic machine for cleaning wallboards, each of the long axial tracks has an elongated water guide pipe and an elongated magnet guiding recess disposed beside and extending parallel to the water guide pipe. Multiple magnetic valves are mounted through an inner wall of each long axial track and correspond to the water guide pipe of each long axial track. A long axial magnet body is mounted in the magnet guiding recess of each long axial track, slides simultaneously along with the corresponding

sliding engine base and controls the magnetic valves that are mounted on the long axial track.

In the above-mentioned automatic machine for cleaning wallboards, each magnetic valve has a valve tube, a magnet, a spring, a waterproof gasket and a magnetic plate. The valve tube has a tubular inner space having a closed end and an open end, multiple grooves axially formed in an inner sidewall defined around the tubular inner space, and multiple through holes radially formed through the valve tube and respectively corresponding to and communicating with the grooves. The magnet is mounted in the tubular inner space of the valve tube. The spring is mounted around the magnet and is disposed in the tubular inner space of the valve tube. The waterproof gasket and the magnetic plate are mounted on the open end of the tubular inner space of the valve tube in sequence. The waterproof gasket has a through hole. The magnetic plate has a through hole. The spring constantly pushes the magnet toward the waterproof gasket, such that the magnet resiliently abuts the waterproof gasket and selectively seals the through hole of the waterproof gasket.

In the above-mentioned automatic machine for cleaning wallboards, each of the long axial tracks has an elongated rack, and the main driving device of each of the sliding engine bases has a driving rod and a driving gear securely mounted on the driving rod and engaging the elongated rack of the corresponding long axial track.

In the above-mentioned automatic machine for cleaning wallboards, two auxiliary driving devices are respectively disposed beside two ends of each

long axial track, and each auxiliary driving device has a roller and a pulling element connected to the roller and the sliding engine base that corresponds to the long axial track.

In the above-mentioned automatic machine for cleaning wallboards, two pivot shafts are rotatably disposed respectively beside the two ends of each long axial track and are perpendicular to the long axial track. The rollers are respectively mounted on the pivot shafts. The pulling element of each auxiliary driving device is connected to the roller and the sliding engine base that corresponds to the long axial track. Each pivot shaft is driven by one auxiliary driving device.

The automatic machine for cleaning wallboards has:

at least two long axial tracks being separated and being parallel to each other;

at least two sliding engine bases respectively mounted slidably on the at least two long axial tracks, and each sliding engine base driven by a main driving device to slide along a corresponding long axial track;

at least one bracket protective cover plate, and each of the at least one bracket protective cover plate mounted on and between each two of the sliding engine bases that are disposed next to each other, being perpendicular to the at least two long axial tracks and having an elongated sliding track longitudinally mounted on the bracket protective cover plate;

at least one sliding brush base, and each of the at least one sliding brush base is driven by a driving apparatus and has a slide disposed on an inner surface of the sliding brush base and slidably mounted on the elongated sliding

track of a corresponding bracket protective cover plate; and

at least one brush bracket, each of the at least one brush bracket is slidably mounted on a corresponding sliding brush base and selectively slides forward and backward relative to the corresponding sliding brush base.

In the above-mentioned automatic machine for cleaning wallboards, each of the at least one brush bracket has a vibrator mounted on the brush bracket.

In the above-mentioned automatic machine for cleaning wallboards, each of the at least one bracket protective cover plate has a partition disposed in the bracket protective cover plate and having multiple through holes separately formed through the partition, and a vent channel defined between an outer wall of the bracket protective cover plate and the partition.

In the above-mentioned automatic machine for cleaning wallboards, each of the at least two long axial tracks has an elongated water guide pipe. Each of the at least one bracket protective cover plate has a water collecting receptacle disposed lower than the elongated water guide pipe of the long axial track that corresponds to a top of the bracket protective cover plate, and a water storage receptacle communicating with the water collecting receptacle.

In the above-mentioned automatic machine for cleaning wallboards, each of the at least two long axial tracks has a mounting recess and is securely attached to the wallboards with at least one T-nut fitted in the mounting recess and attached to the wallboard.

In the above-mentioned automatic machine for cleaning wallboards, each of the long axial tracks has multiple recessed tracks, and each of the

sliding engine bases has multiple wheels slidably mounted in the recessed tracks of the corresponding long axial track.

In the above-mentioned automatic machine for cleaning wallboards, each of the long axial tracks has an electric rail, and each of the sliding engine bases has a conduction frame corresponding to and electrically connected to the electric rail of the corresponding long axial track.

In the above-mentioned automatic machine for cleaning wallboards, each of the long axial tracks has an elongated water guide pipe and an elongated magnet guiding recess disposed beside and extending parallel to the water guide pipe. Multiple magnetic valves are mounted through an inner wall of each long axial track and correspond to the water guide pipe of each long axial track. A long axial magnet body is mounted in the magnet guiding recess of each long axial track, slides simultaneously along with the corresponding sliding engine base and controls the magnetic valves that are mounted on the long axial track.

In the above-mentioned automatic machine for cleaning wallboards, each magnetic valve has a valve tube, a magnet, a spring, a waterproof gasket and a magnetic plate. The valve tube has a tubular inner space having a closed end and an open end, multiple grooves axially formed in an inner sidewall defined around the tubular inner space, and multiple through holes radially formed through the valve tube and respectively corresponding to and communicating with the grooves. The magnet is mounted in the tubular inner space of the valve tube. The spring is mounted around the magnet and is disposed in the tubular inner space of the valve tube. The waterproof gasket

and the magnetic plate are mounted on the open end of the tubular inner space of the valve tube in sequence. The waterproof gasket has a through hole. The magnetic plate has a through hole. The spring constantly pushes the magnet toward the waterproof gasket, such that the magnet resiliently abuts the waterproof gasket and selectively seals the through hole of the waterproof gasket.

In the above-mentioned automatic machine for wallboards, each of the long axial tracks has an elongated rack, and the main driving device of each of the sliding engine bases has a driving rod and a driving gear securely mounted on the driving rod and engages the elongated rack of the corresponding long axial track.

In the above-mentioned automatic machine for cleaning wallboards, two auxiliary driving devices are respectively disposed beside two ends of each long axial track, and each auxiliary driving device has a roller and a pulling element connected to the roller and the sliding engine base that corresponds to the long axial track.

In the above-mentioned automatic machine for cleaning wallboards, two pivot shafts are rotatably disposed respectively beside the two ends of each long axial track and are perpendicular to the long axial track. The rollers are respectively mounted on the pivot shafts. The pulling element of each auxiliary driving device is connected to the roller and the sliding engine base that corresponds to the long axial track. Each pivot shaft is driven by one auxiliary driving device.

The automatic machine for cleaning wallboards in accordance with the

present invention has the following advantages. The long axial tracks may be made of materials with antioxidant properties and are orderly mounted on the wallboards. When the automatic machine is not in operation, the brush brackets are put aside of the building and the power extending objects retract the brush brackets. Thus, the brushes of the brush brackets are moved off the wallboards and will not be easily deformed. The bracket protective cover plate protects the brush brackets and beautifies appearance of the automatic machine.

IN THE DRAWINGS:

Fig. 1 is a perspective view of a first embodiment of an automatic machine for cleaning wallboards in accordance with the present invention, showing a protective cover plate being omitted;

Fig. 2 is an enlarged exploded perspective view of the automatic machine in Fig. 1;

Fig. 3 is an exploded perspective view of a magnetic valve of the automatic machine in Fig. 1;

Fig. 4 is an end view of an long axial track of the automatic machine in Fig. 1;

Fig. 5 is an enlarged side view of the automatic machine in Fig. 1;

Fig. 6 is an enlarged perspective view of the automatic machine in Fig. 1, showing a roller pulling a pulling element;

Fig. 7 is a perspective view of a second embodiment of an automatic machine for wallboards in accordance with the present invention;

Fig. 8 is an enlarged exploded perspective view of the automatic machine in Fig. 7; and

Fig. 9 is an enlarged side view in partial section of the automatic machine in Fig. 7.

The following descriptions of the preferred embodiments of the present invention are accompanied with the aforementioned attached drawings to explain the techniques for achieving the objective of the present invention.

With reference to Figs. 1 and 2, a first preferred embodiment of an automatic machine for cleaning wallboards in accordance with the present invention is adapted for cleaning the wallboards 90 having protrusions and has at least two sliding engine bases 20, at least two brush supporting bases 50A respectively mounted on the at least two sliding engine bases 20, at least one elongated rod 24A and at least one long axial brush 40A rotatably mounted around the at least one elongated rod 24A. Each of the at least one elongated rod 24A is mounted between two of the at least two brush supporting bases 50A that are disposed next to each other. Each of the at least one long axial brush 40A has at least one vibrator 42A. The at least one vibrator 42A vibrates the long axial brush 40A so that the long axial brush 40A cleans the wallboards 90. When the automatic machine is cleaning the wallboards 90, the at least one long axial brush 40A abuts the wallboards 90 and freely rotates. When the at least one long axial brush 40A encounters the protrusions, the at least one long axial brush 40A rolls across the protrusions such that the protrusions of the wallboards 90 are easily cleaned.

A specific structure of the first preferred embodiment of the automatic machine for cleaning wallboards in accordance with the present invention comprises multiple magnetic valves 30, at least two long axial tracks 10, at least

two sliding engine bases 20, at least two brush supporting bases 50A, at least one long axial brush 40A and at least one protective cover plate 60A.

With further reference to Fig. 3, each magnetic valve 30 has a valve tube 31, a magnet 32, a spring 33, a waterproof gasket 34 and a magnetic plate 35. The valve tube 31 has a tubular inner space 311, multiple grooves 312 and multiple through holes 313. The tubular inner space 311 has a closed end, an open end and two different inner diameters. One inner diameter of the tubular inner space 311 is defined at the open end of the tubular inner space 311 and is longer than the other inner diameter of the tubular inner space 311 defined at the closed end of the tubular inner space 311. The grooves 312 are axially formed in an inner sidewall defined around the tubular inner space 311. The through holes 313 of the valve tube 31 are radially formed through the valve tube 31 and respectively correspond to and communicate with the grooves 312. The magnet 32 undergoes an anti-rust treatment and a hardening treatment, is mounted in the tubular inner space 311 of the valve tube 31 and has two rod portions. The two rod portions have different outer diameters being respectively equal to the two different inner diameters of the tubular inner space 311. The spring 33 is mounted around the rod portion with a shorter outer diameter, is disposed in the tubular inner space 311 at the closed end with a longer inner diameter, and has an inner diameter and two ends. The inner diameter of the spring 33 is equal to the shorter outer diameter of the rod portion. The ends of the spring 33 respectively abut the inner sidewall of the valve tube 31 and the magnet 32. The waterproof gasket 34 and the magnetic plate 35 are mounted on the open end of the tubular inner space 311 of the

valve tube 31 in sequence and are securely attached to the valve tube 31 via screws 36. The waterproof gasket 34 has a through hole 341 formed through a center of the waterproof gasket 34. The magnetic plate 35 has a through hole 351 formed through a center of the magnetic plate 35. The spring 33 constantly pushes the magnet 32 toward the waterproof gasket 34, such that the magnet 32 resiliently abuts the waterproof gasket 34 and selectively seals the through hole 341 of the waterproof gasket 34.

With reference to Figs. 2 and 4, each long axial track 10 may be made by an aluminum extrusion process, is substantially rectangular and has multiple axial channels, multiple axial recesses, a long axial magnet body 151, an electric rail 141 and an elongated rack 171. One of the axial channels is defined as a water guide pipe 11. Three of the axial recesses are defined as three recessed tracks 12. The three recessed tracks 12 are respectively formed in three elongated outer surfaces of the long axial track 10. Moreover, the others of the axial recesses are respectively defined as a mounting recess 13, a conductive track recess 14, a magnet guiding recess 15, a magnetic valve recess 16 and a rack recess 17. The magnet guiding recess 15 is disposed beside and extends parallel to the water guide pipe 11. The magnetic valve recess 16 has an inner wall and multiple mounting holes 161. The inner wall of the magnetic valve recess 16 is defined between the magnetic valve recess 16 and the water guide pipe 11. The mounting holes 161 of the magnetic valve recess 16 are separately formed through the inner wall of the magnetic valve recess 16. The magnetic valves 30 are respectively mounted through the mounting holes 161 of the magnetic valve recess 16. The valve tube 31 of each magnetic valve 30

has multiple fastening holes 314 and is securely attached to a sidewall defined around the magnetic valve recess 16 via multiple screws mounted through the fastening holes 314 of the valve tube 31 and fastened to the sidewall of the magnetic valve recess 16. The long axial magnet body 151 is mounted in the magnet guiding recess 15. The electric rail 141 is mounted in the conductive track recess 14 and has an end electrically connected to a power source. The elongated rack 171 is mounted in the rack recess 17 and has a bottom, a top and multiple teeth. A size of the bottom of the elongated rack 171 corresponds to a size of the rack recess 17. The teeth of the elongated rack 171 are formed on the top of the elongated rack 171 and protrude out of the rack recess 17.

The at least two sliding engine bases 20 are slidably mounted on the at least two long axial tracks 10. Each sliding engine base 20 has a sliding bracket 21, multiple wheels 22 and a main driving device 23. The sliding bracket 21 corresponds to dimensions of a corresponding long axial track 10, is mounted around the corresponding long axial track 10 and has two ends, multiple mounting holes 211, a conduction frame 213, two mounting wings 214, a mounting seat 215 and a gear hole 216. The mounting holes 211 of the sliding bracket 21 are separately formed through the sliding bracket 21, are disposed at the ends of the sliding bracket 21 and correspond to the recessed tracks 12 of the corresponding long axial track 10. The conduction frame 213 is mounted on an inner wall of the sliding bracket 21, and corresponds to and is electrically connected to the electric rail 141. The mounting wings 214 are respectively formed on the ends of the sliding bracket 21, and correspond to and are mounted in the magnet guiding recess 15. Each mounting wing 214 has a pivot

hole 2141. The long axial magnet body 151 of the corresponding long axial track 10 is disposed between the mounting wings 214. The mounting seat 215 is formed on an outer wall of the sliding bracket 21. The gear hole 216 is formed through the sliding bracket 21 and corresponds to the elongated rack 171. The wheels 22 are mounted in the recessed tracks 12 of the corresponding long axial track 10 and are rotatably connected to the sliding bracket 21 via multiple screws 212. The main driving device 23 is mounted on the mounting seat 215 and has a driving rod and a driving gear 231. The driving rod is rotatably mounted through the mounting seat 215. The driving gear 231 is securely mounted on the driving rod, is mounted in the gear hole 216 and engages the elongated rack 171 of the corresponding long axial track 10. Thus, the sliding bracket 21 connecting with the wheels 22 is slidably mounted on the corresponding long axial track 10. The conduction frame 213 that is electrically connected to the electric rail 141 provides electric power to the main driving device 23 to allow the main driving device 23 to drive the sliding engine base 20 to slide along the corresponding long axial track 10.

The at least two brush supporting bases 50A are respectively mounted on the at least two sliding engine bases 20. Each of the at least two brush supporting bases 50A has a mounting tube 51A, two pairs of ears, a driven rod 513A, a pivot base 52A, a pivot rod 53A and a power extending object 54A. The mounting tube 51A has an axial hole 511A axially formed through the mounting tube 51A. The two pairs of ears oppositely protrude radially from an outer surface of the mounting tube 51A. The ears of each pair are respectively disposed adjacent to two ends of the mounting tube 51A. Each ear of one of the

two pairs has a pivot hole 512A formed through the ear and disposed adjacent to a distal end of the ear. The driven rod 513A is rotatably mounted between the ears of the other pair of ears and has a connecting hole 5131A. The pivot base 52A is securely mounted on the sliding bracket 21 via screws and has a pivot hole 521A axially formed through the pivot base 52A. The pivot rod 53A is pivotally mounted through the pivot holes 512A of the ears and the pivot hole 521A of the pivot base 52A. The power extending object 54A is pivotally mounted on the sliding bracket 21 and has a distal end mounted in the connecting hole 5131A of the driven rod 513A and connected to the driven rod 513A.

Each of the at least one long axial brush 40A is mounted between two of the at least two brush supporting bases 50A that are disposed next to each other, and has an elongated tube 41A, at least one vibrator 42A and at least two bearings 43A. The elongated tube 41A has multiple bristles 411A, an axial hole and at least one vibrator recess 412A. The bristles 411A are mounted on an outer surface of the elongated tube 41A. The axial hole of the elongated tube 41A is axially formed through the elongated tube 41A. The at least one vibrator recess 412A is formed in an inner surface of the elongated tube 41A. The at least one vibrator 42A is mounted in the at least one vibrator recess 412A of the elongated tube 41A. As shown in the drawings, the elongated tube 41A has one vibrator recess 412A for mounting one vibrator 42A. Each of the at least one vibrator 42A has an axial hole 421A axially formed through the vibrator 42A and being coaxial with the axial hole of the elongated tube 41A. The at least two bearings 43A are securely mounted around the at least one vibrator 42A.

Each two of the at least two bearings 43A are disposed at two ends of a corresponding vibrator 42A. Thus, the at least one vibrator 42A is rotatably mounted in the at least one vibrator recess 412A.

The at least one protective cover plate 60A is U-shaped and elongated, is mounted around the at least one long axial brush 40A, baffles cleaning water and protects the at least one long axial brush 40A. Each of the at least one protective cover plate 60A has two ends, a partition 61A and a vent channel 62A. The ends of the protective cover plate 60A are respectively connected securely to the sliding brackets 21 of two of the at least two sliding engine bases 20 that are disposed next to each other. The partition 61A is axially disposed in the protective cover plate 60A and has multiple through holes 611A separately formed through the partition 61A. The vent channel 62A is defined between an outer wall of the protective cover plate 60A and the partition 61A.

With reference to Figs. 1, 2 and 5, the first preferred embodiment of the automatic machine for cleaning wallboards in accordance with the present invention is mounted on the wallboards 90 of a building. Multiple long axial tracks 10 of the automatic machine are parallelly mounted on the wallboard 90. Each long axial track 10 is securely attached to the wallboard 90 with T-nuts 131, fasteners 133 and bolts 132 fitted in the mounting recess 13 and attached to the wallboard 90. Multiple water supply pipes respectively communicate with the water guide pipes 11 of the long axial tracks 10 and supply water from pumps or tap water pipeline to the long axial tracks 10. At least one sliding engine base 20 is mounted on each long axial track 10. As shown in the drawings, three long axial tracks 10 are parallelly mounted on the wallboard 90.

One sliding engine base 20 is mounted on each long axial track 10. One brush supporting base 50A is mounted on each sliding engine base 20. One long axial brush 40A is mounted between each two of the brush supporting bases 50A that are disposed next to each other. The way to assemble the brush supporting bases 50A and the long axial brush 40A is as follows. The long axial brushes 40A are coaxial with the axial holes 421A of the vibrators 42A and the axial holes 511A of the mounting tubes 51A of the brush supporting bases 50A. One elongated rod 24A that may be a cable, a round steel rod, a tube or the like, is mounted through the axial holes 511A of the mounting tubes 51A of the brush supporting bases 50A and the axial holes 421A of the vibrators 42A. Multiple springs 44A are mounted around the elongated rod 24A and are respectively disposed beside ends of the long axial brushes 40A. The elongated rod 24A is strained and is connected to the brush supporting bases 50A. Thus, the long axial brushes 40A are linearly arranged and are perpendicular to the long axial tracks 10. Then, multiple protective cover plates 60A are respectively mounted around the long axial brushes 40A and are respectively attached securely to the sliding engine bases 20. The vent channel 62A of each protective cover plate 60A is connected to a blower 63A. The blower 63A may be mounted on one of the ends of the protective cover plate 60A and has an outlet communicating with the vent channel 62A.

With further reference to Fig. 6, two auxiliary driving devices 71 are mounted on the wallboard 90 and are respectively disposed beside two ends of each of the at least one long axial track 10. Each auxiliary driving device 71 has a pivot shaft 74, at least one roller 711 and at least one pulling element 72.

The at least one roller 711 is securely mounted on the pivot shaft 74. The at least one pulling element 72 is mounted around the at least one long axial track 10. Each of the at least one pulling element 72 is further mounted around the rollers 711 of the two auxiliary driving devices 71 that are disposed beside the ends of a corresponding long axial track 10, and has two ends. The ends of the pulling element 72 are connected to the mounting wings 214 of the sliding bracket 21 that is mounted on the corresponding long axial track 10. Thus, the pulling element 72 selectively pulls the sliding bracket 21 to slide on the long axial track 10. Specifically, as shown in the drawings, the pivot shafts 74 are mounted through bearing seats 73 mounted on the wallboard 90, and are respectively disposed beside the two ends of each long axial track 10. Each pivot shaft 74 is driven by one auxiliary driving device 71. The rollers 711 that are mounted on each pivot shaft 74 respectively correspond to the long axial tracks 10. Multiple pulling elements 72 are respectively mounted around the long axial tracks 10 and the rollers 711 on the pivot shafts 74. The ends of each pulling element 72 are connected to the mounting wings 214 of a corresponding sliding bracket 21. The above-mentioned pulling element 72 may be a chain, a belt or as shown in the drawings, a cable connected to the mounting wings 214 of the corresponding sliding bracket 21 and mounted around the rollers 711 that are disposed beside the ends of the corresponding long axial track 10. As the rollers 711 alternately rotate, the sliding engine base 20 slides along the long axial track 10.

When the first preferred embodiment of the automatic machine for cleaning wallboards in accordance with the present invention is in operation,

the cleaning water flows into the water guide pipes 11 of the long axial tracks 10. The main driving devices 23 or the auxiliary driving devices 71 are switched on to drive all of the sliding engine bases 20 to simultaneously slide along the long axial tracks 10. As the power extending object 54A retracts, the bristles 411A of the at least one long axial brush 40A abut the wallboard 90. The at least one vibrator 42A vibrates, so the at least one long axial brush 40A vibrates as well. Since the at least one long axial brush 40A is rotatable, the at least one long axial brush 40A rolls across the protrusions of the wallboard 90 with lowered resistance and easily cleans the wallboard 90. The mounting wings 214 of the sliding brackets 21 simultaneously push the long axial magnet bodies 151 to slide along the magnet guiding recesses 15. The long axial magnet bodies 151 and the magnets 32 of the magnetic valves 30 attract each other. Thus, when the sliding engine bases 20 slide by, the magnets 32 are attracted by the long axial magnet bodies 151 and loosen the waterproof gaskets 34 so the through holes 341 of the waterproof gaskets 34 are revealed. Consequently, the cleaning water in the water guide pipes 11 of the long axial tracks 10 is drained from the magnetic valves 30 and flows over the wallboard 90. When the sliding engine bases 20 as well as the long axial magnet bodies 151 depart from the magnetic valves 30, the springs 33 of the magnetic valves 30 push the magnets 32 and the magnetic plates 35 of the magnetic valves 30 attract the magnets 32, so the magnets 32 seal the through holes 341 of the waterproof gaskets 34 to prevent the cleaning water in the water guide pipes 11 from being drained. Moreover, water drops left on the wallboard 90 is cleaned away with the sliding engine bases 20 sliding across and the bristles 411A of

the at least one long axial brush 40A abutting the wallboards 90 such that the vibrators 42A vibrate the at least one long axial brush 40A. Additionally, after the wallboard 90 has been cleaned, the blower 63A may be switched on to guide air with high pressure into the vent channel 62A of the at least one protective cover plate 60A. The air further flows through the through holes 611A of the partition 61A to dry the water drops.

In the above-mentioned automatic machine, the long axial tracks 10 may be made of materials with antioxidant properties and are orderly mounted on the wallboard 90. When the automatic machine is not in operation, the at least one long axial brush 40A is put aside of the building and the power extending objects 54A protrude and push the brush supporting bases 50A. Thus, the bristles 411A of the at least one long axial brush 41A are moved off the wallboard 90 and will not be easily deformed. The at least one protective cover plate 60A protects the at least one long axial brush 40A and beautifies appearance of the automatic machine.

With reference to Figs. 7 and 8, a second preferred embodiment of an automatic machine for cleaning wallboards in accordance with the present invention is also mounted on the wallboards 90 of the building. Multiple long axial tracks 10 of the automatic machine are parallelly mounted on the wallboard 90. At least one sliding engine base 20 is mounted on each long axial track 10. Differences between the second preferred embodiment and the first preferred embodiment of the automatic machine are as follows. A bracket protective cover plate 60B is mounted on and between each two of the sliding engine bases 20B that are disposed on the long axial tracks 10 and next to each

other. A sliding brush base 50B is mounted on each bracket protective cover plate 60B and is capable of axial sliding along the bracket protective cover plate 60B. A brush bracket 40B with brush 41B is retractably mounted on each sliding brush base 50B, selectively abuts the wallboard 90 and has a vibrator 42B. Thus, the second preferred embodiment of the automatic machine may be numerically controlled to wash a partial of the wallboard 90 with the brushes 41B of the brush brackets 40B. For example, the second preferred embodiment of the automatic machine can selectively wash glass windows 91 of the wallboard 90.

A specific structure of the second preferred embodiment of the automatic machine for cleaning the wallboards in accordance with the present invention comprises multiple magnetic valves 30, at least two long axial tracks 10, at least two sliding engine bases 20, at least one bracket protective cover plate 60B, at least one brush bracket 40B and at least two sliding brush bases 50B. The magnetic valves 30, the at least two long axial tracks 10 and the at least two sliding engine bases 20 of the second preferred embodiment of the automatic machine are the same as the magnetic valves 30, the at least two long axial tracks 10 and the at least two sliding engine bases 20 of the first preferred embodiment of the automatic machine.

With reference to Fig. 8, the at least one bracket protective cover plate 60B is U-shaped and elongated. Each of the at least one bracket protective cover plate 60B has a partition 61B, an elongated vent channel 62B, two elongated sliding tracks 64B, a driving apparatus 65B, a transmission roller 66B, a guide roller 67B, a water collecting receptacle 68B and a water storage

receptacle 69B. The partition 61B is disposed in the bracket protective cover plate 60B and has multiple through holes 611B formed through the partition 61B. The vent channel 62B is defined between an outer wall of the bracket protective cover plate 60B and the partition 61B. The elongated sliding tracks 64B are respectively mounted longitudinally on two elongated edges of the bracket protective cover plate 60B. Each elongated sliding track 64B is attached to the bracket protective cover plate 60B via screws 641B. The driving apparatus 65B is securely mounted on the partition 61B and is disposed adjacent to a top of the partition 61B. The transmission roller 66B is mounted adjacent to the top of the partition 61B and is connected to the driving apparatus 65B. The guide roller 67B is mounted adjacent to a bottom of the partition 61B. The water collecting receptacle 68B is mounted on a top of the bracket protective cover plate 60B and is disposed lower than the long axial track 10 that corresponds to the top of the bracket protective cover plate 60B and the sliding engine base 20 that is mounted on the long axial track 10. The water storage receptacle 69B is mounted on the top of the bracket protective cover plate 60B, is disposed below the water collecting receptacle 68B and communicates with the water collecting receptacle 68B via a guiding tube. A pump (not shown) may be mounted on the water storage receptacle 69B.

Each of the at least one brush bracket 40B is elongated and has a brush 41B, multiple pivot seats 43B and a vibrator 42B. The brush 41B is mounted on an outer surface of the brush bracket 40B and is changeable. The pivot seats 43 are separately mounted on an inner surface of the brush bracket 40B. As shown in the drawing, the brush bracket 40B has two pairs of pivot seats 43

respectively disposed adjacent to a top and a bottom of the brush bracket 40B.

The vibrator 42B is mounted on the brush bracket 40B.

Each of the at least two sliding brush bases 50B is a rectangular frame, is capable of being received in the bracket protective cover plate 60B, and has two slides 52B, two fastening seats 51B, a pulling element 53B, multiple pivot seats 54B, multiple connecting rods 55B and a power extending object 44B.

The slides 52B are disposed on an inner surface of the sliding brush base 50B, respectively disposed adjacent to two opposite side edges of the sliding brush base 50B and are respectively mounted slidably on the elongated sliding tracks 64B of the bracket protective cover plate 60B. The fastening seats 51B are disposed on the inner surface of the sliding brush base 50B and are respectively disposed adjacent to an upper edge and a lower edge of the sliding brush base 50B. The pulling element 53B may be a chain, a belt or a cable, is mounted around the transmission roller 66B and the guide roller 67B, and has two ends respectively connected to the fastening seats 51B. The pivot seats 54B of the sliding brush base 50B are separately mounted on an outer surface of the sliding brush base 50B and respectively correspond to the pivot seats 43B of the brush bracket 40B. Each connecting rod 55B is connected to one of the pivot seats 54B of the sliding brush base 50B and one of the pivot seats 43B of the brush bracket 40B that correspond to each other. Thus, the brush bracket 40B parallelly slides up and down relative to the sliding brush base 50B. The power extending object 44B is pivotally connected to the brush bracket 40B and the sliding brush base 50B and selectively drives the brush bracket 40B to slide up and down, and forward and backward.

With further reference to Figs. 7 and 9, the second preferred embodiment of the automatic machine for cleaning wallboards in accordance with the present invention is mounted on the wallboards 90 of a building. Multiple long axial tracks 10 of the automatic machine are parallelly mounted on the wallboard 90. Means of attaching the long axial tracks 10 of the second preferred embodiment are the same as in the first preferred embodiment of the automatic machine. Each long axial track 10 is securely attached to the wallboard 90 with T-nuts 131, fasteners 133 and bolts 132 fitted in the mounting recess 13 and attached to the wallboard 90. Multiple water supply pipes respectively communicate with the water guide pipes 11 of the long axial tracks 10 and supply water from pumps or tap water pipeline to the long axial tracks 10. At least one sliding engine base 20 is mounted on each long axial track 10. As shown in the drawings, three long axial tracks 10 are parallelly mounted on the wallboard 90. One sliding engine base 20 is mounted on each long axial track 10. One bracket protective cover plate 60B is mounted between each two of the sliding engine bases 20 that are disposed next to each other and is screwed to the sliding brackets 21 of the sliding engine bases 20. Thus, the bracket protective cover plates 60B are linearly arranged and are perpendicular to the long axial tracks 10. One sliding brush base 50B and one brush bracket 40B are mounted on each bracket protective cover plate 60B. The vent channel 62A of each protective cover plate 60A is connected to a blower 63A. The blower 63A may be mounted on one of the ends of the protective cover plate 60A and has an outlet communicating with the vent channel 62A.

The second preferred embodiment of the automatic machine is

controlled by a controlling mechanism. Preferably, the controlling mechanism may be a programmed numerical control to selectively wash a partial of the wallboard 90. Take washing the glass window 91 of the wallboard 90 for example. Operating processes of the second preferred embodiment of the automatic machine are input into the programmed numerical control. At first, the main driving devices 23 or the auxiliary driving devices 71 are switched on to drive all of the sliding engine bases 20 to simultaneously slide transversely along the long axial tracks 10 to correspond to the glass windows 91. Then, the driving apparatuses 65B of the bracket protective cover plates 60B drive the sliding brush bases 50B to slide longitudinally to correspond to specific positions of the glass windows 91. When the sliding engine bases 20 and the sliding brush bases 50B correspond to the glass windows 91, the programmed numerical control controls cleaning water from tap water or pumps to flow into the water guide pipes 11 of the long axial tracks 10. The long axial magnet bodies 151 and the magnets 32 of the magnetic valves 30 attract each other. Thus, the waterproof gaskets 34 are loosened from the magnets 32 of the magnetic valve 30 and the through holes 341 of the waterproof gasket 34 are revealed. Consequently, the cleaning water in the water guide pipes 11 of the long axial tracks 10 is drained from the magnetic valves 30 when the sliding engine bases 20 slide by.

In the second preferred embodiment of the automatic machine, each of the magnetic valves 30 further has a bent pipe 300B. The bent pipe 300B is connected to an outlet of the magnetic valve 30, is bending downward and has an outlet corresponding to the water collecting receptacle 68B of the bracket

protective cover plate 60B. Therefore, the cleaning water drained from the water guide pipe 11 of the long axial track 10 further flows into the water collecting receptacle 68B below the magnetic valve 30, and flows through the guiding tube to flow into the water storage receptacle 69B. When the water storage receptacle 69B receives enough cleaning water, the programmed numerical control activates the power extending object 44B to drive the brush bracket 40B to slide toward the glass window 91, then activates the pump mounted on the water storage receptacle 69B to pump the cleaning water to the glass window 91, and activates the vibrator 42B to vibrate the brush bracket 40B to clean the glass window 91.

At the same time, the main driving devices 23 or the auxiliary driving devices 71 drive the sliding engine bases 20 to slide transversely, and the driving apparatuses 65B drive the sliding brush bases 50B to slide longitudinally to allow the sliding engine bases 20 and the sliding brush bases 50B to slide within corresponding glass windows 91 and to clean the corresponding glass windows 91. After the glass windows 91 have been cleaned, the blower 63B is switched on to dry the water drop on the glass windows 91. Moreover, the power extending objects 44B retract the brush brackets 40B and the brush brackets 40B depart from the glass windows 91. Then, the sliding engine bases 20, the bracket protective cover plates 60B, the brush brackets 40B and the sliding brush bases 50B slide along the long axial tracks 10 to clean other glass windows 91 or slide back to and are stored at a side of the building.

In the above-mentioned automatic machine, the long axial tracks 10

may be made of materials with antioxidant properties and are orderly mounted on the wallboard 90. When the automatic machine is not in operation, the brush brackets 40B are put aside of the building and the power extending objects 44B retract the brush brackets 40B. Thus, the brushes 41B of the brush brackets 40B are moved off the wallboard 90 and will not be easily deformed. The bracket protective cover plate 60B protects the brush brackets 40B and beautifies appearance of the automatic machine.

Even though numerous characteristics and advantages of the present invention have been set forth in the foregoing description, together with details of the structure and features of the invention, the disclosure is illustrative only. Changes may be made in the details, especially in matters of shape, size, and arrangement of parts within the principles of the invention to the full extent indicated by the broad general meaning of the terms in which the appended claims are expressed.

CLAIM(S):

1. An automatic machine for cleaning wallboards comprising two long axial tracks (10) being separated and being parallel to each other;

at least two sliding engine bases (20) respectively mounted slidably on the long axial tracks (10), and each sliding engine base (20) driven by a main driving device (23) to slide along a corresponding long axial track (10);

at least two brush supporting bases (50A) respectively mounted movably on the at least two sliding engine bases (20), and each brush supporting base (50A) driven by a power extending object (54A) and selectively moving toward or away from a corresponding sliding engine base (20); and

at least one long axial brush (40A) rotatably mounted around at least one elongated rod (24A) and being perpendicular to the long axial tracks (10), and each of the at least one long axial brush (40A) mounted between and sliding along with two of the at least two brush supporting bases (50A) that are disposed next to each other and having

an elongated tube (41A) having multiple bristles (411A); and

at least one vibrator (42A) mounted in the long axial brush (40A).

2. The automatic machine for cleaning wallboards as claimed in claim 1, wherein the at least one long axial brush (40A) and the at least one elongated rod (24A) freely rotate relative to each other.

3. The automatic machine for cleaning wallboards as claimed in claim

2, wherein at least two springs (44A) are mounted around the at least one elongated rod (24A) and are respectively disposed beside ends of the at least one long axial brush (40A).

4. The automatic machine for cleaning wallboards as claimed in claim 3, wherein

the at least two brush supporting bases (50A) are pivotally mounted on the at least two sliding engine bases (20) and are respectively connected to the power extending objects (54A); each of the power extending objects (54A) has a distal end connected to a corresponding sliding engine base (20); and

when the power extending objects (54A) selectively retract, the at least two brush supporting bases (50A) pivot forward and backward relative to the at least two sliding engine bases (20).

5. The automatic machine for cleaning wallboards as claimed in claim 4 further comprising at least one protective cover plate (60A) mounted around the at least one long axial brush (40A), and each of the at least one protective cover plate (60A) having

a partition (61A) disposed in the protective cover plate (60A) and having multiple through holes (611A) separately formed through the partition (61A); and

a vent channel (62A) defined between an outer wall of the protective cover plate (60A) and the partition (61A).

6. The automatic machine for cleaning wallboards as claimed in claim 5, wherein each of the long axial tracks (10) has a mounting recess (13) and is securely attached to the wallboard with at least one T-nut (131) fitted in the.

mounting recess (13) and attached to the wallboard.

7. The automatic machine for cleaning wallboards as claimed in claim 6, wherein

each of the long axial tracks (10) has multiple recessed tracks (12); and
each of the sliding engine bases (20) has multiple wheels (22) slidably mounted in the recessed tracks (12) of the corresponding long axial track (10).

8. The automatic machine for cleaning wallboards as claimed in claim 7, wherein

each of the long axial tracks (10) has an electric rail (141); and
each of the sliding engine bases (20) has a conduction frame (213) corresponding to and electrically connected to the electric rail (141) of the corresponding long axial track (10).

9. The automatic machine for cleaning wallboards as claimed in claim 8, wherein

each of the long axial tracks (10) has an elongated water guide pipe (11) and an elongated magnet guiding recess (15) disposed beside and extending parallel to the water guide pipe (11);

multiple magnetic valves (30) are mounted through an inner wall of each long axial track (10) and correspond to the water guide pipe (11) of each long axial track (10); and

a long axial magnet body (151) is mounted in the magnet guiding recess (15) of each long axial track (10), slides simultaneously along with the corresponding sliding engine base (20) and controls the magnetic valves (30) that are mounted on the long axial track (10).

10. The automatic machine for cleaning wallboards as claimed in claim 9, wherein each magnetic valve (30) has

a valve tube (31) having a tubular inner space (311) having a closed end and an open end, multiple grooves (312) axially formed in an inner sidewall defined around the tubular inner space (311), and multiple through holes (313) radially formed through the valve tube (31) and respectively corresponding to and communicating with the grooves (312);

a magnet (32) mounted in the tubular inner space (311) of the valve tube (31);

a spring (33) mounted around the magnet (32) and disposed in the tubular inner space (311) of the valve tube (31);

a waterproof gasket (34) and a magnetic plate (35) mounted on the open end of the tubular inner space (311) of the valve tube (31) in sequence, the waterproof gasket (34) having a through hole (341), and the magnetic plate (35) having a through hole (351);

wherein the spring (33) constantly pushes the magnet (32) toward the waterproof gasket (34), such that the magnet (32) resiliently abuts the waterproof gasket (34) and selectively seals the through hole (341) of the waterproof gasket (34).

11. The automatic machine for cleaning wallboards as claimed in claim 10, wherein

each of the long axial track (10)s has an elongated rack (171); and

the main driving device (23) of each of the sliding engine bases (20) has a driving rod and a driving gear (231) securely mounted on the driving rod

and engaging the elongated rack (171) of the corresponding long axial track (10).

12. The automatic machine for cleaning wallboards as claimed in claim 11, wherein two auxiliary driving devices (71) are respectively disposed beside two ends of each long axial track (10), and each auxiliary driving device (71) has a roller (711) and a pulling element (72) connected to the roller (711) and the sliding engine base (20) that corresponds to the long axial track (10).

13. The automatic machine for cleaning wallboards as claimed in claim 12, wherein

two pivot shafts (74) are rotatably disposed respectively beside the two ends of each long axial track (10) and are perpendicular to the long axial track (10);

the rollers (711) are respectively mounted on the pivot shafts (74);

the pulling element (72) of each auxiliary driving device (71) is connected to the roller (711) and the sliding engine base (20) that corresponds to the long axial track (10); and

each pivot shaft (74) is driven by one auxiliary driving device (71).

14. An automatic machine for cleaning wallboards characterized by comprising:

at least two long axial tracks (10) being separated and being parallel to each other;

at least two sliding engine bases (20) respectively mounted slidably on the at least two long axial tracks (10), and each sliding engine base (20) driven by a main driving device (23) to slide along a corresponding long axial track

(10);

at least one bracket protective cover plate (60B), and each of the at least one bracket protective cover plate (60B) mounted on and between each two of the sliding engine bases (20) that are disposed next to each other, being perpendicular to the at least two long axial tracks (10) and having an elongated sliding track (64B) longitudinally mounted on the bracket protective cover plate (60B);

at least one sliding brush base (50B), and each of the at least one sliding brush base (50B) driven by a driving apparatus (65B) and having a slide (52B) disposed on an inner surface of the sliding brush base (50B) and slidably mounted on the elongated sliding track (64B) of a corresponding bracket protective cover plate (60B); and

at least one brush bracket (40B), each of the at least one brush bracket (40B) slidably mounted on a corresponding sliding brush base (50B) and selectively sliding forward and backward relative to the corresponding sliding brush base (50B).

15. The automatic machine for cleaning wallboards as claimed in claim 14, wherein each of the at least one brush bracket (40B) has a vibrator (42B) mounted on the brush bracket (40B).

16. The automatic machine for cleaning wallboards as claimed in claim 15, wherein each of the at least one bracket protective cover plate (60B) has a partition (61B) disposed in the bracket protective cover plate (60B) and having multiple through holes (611B) separately formed through the partition (61B); and

a vent channel (62B) defined between an outer wall of the bracket protective cover plate (60B) and the partition (61B).

17. The automatic machine for cleaning wallboards as claimed in claim 16, wherein

each of the at least two long axial tracks (10) has an elongated water guide pipe (11); and

each of the at least one bracket protective cover plate (60B) has

a water collecting receptacle (68B) disposed lower than the elongated water guide pipe (11) of the long axial track (10) that corresponds to a top of the bracket protective cover plate (60B); and

a water storage receptacle (69B) communicating with the water collecting receptacle (68B).

18. The automatic machine for cleaning wallboards as claimed in claim 17, wherein each of the at least two long axial tracks (10) has a mounting recess (13) and is securely attached to the wallboard with at least one T-nut (131) fitted in the mounting recess (13) and attached to the wallboard.

19. The automatic machine for cleaning wallboards as claimed in claim 18, wherein

each of the long axial tracks (10) has multiple recessed tracks (12); and

each of the sliding engine bases (20) has multiple wheels (22) slidably mounted in the recessed tracks (12) of the corresponding long axial track (10).

20. The automatic machine for cleaning wallboards as claimed in claim 19, wherein

each of the long axial tracks (10) has an electric rail (141); and

each of the sliding engine bases (20) has a conduction frame (213) corresponding to and electrically connected to the electric rail (141) of the corresponding long axial track (10).

21. The automatic machine for cleaning wallboards as claimed in claim 20, wherein

each of the long axial tracks (10) has an elongated water guide pipe (11) and an elongated magnet guiding recess (15) disposed beside and extending parallel to the water guide pipe (11);

multiple magnetic valves (30) are mounted through an inner wall of each long axial track (10) and correspond to the water guide pipe (11) of each long axial track (10); and

a long axial magnet body (151) is mounted in the magnet guiding recess (15) of each long axial track (10), slides simultaneously along with the corresponding sliding engine base (20) and controls the magnetic valves (30) that are mounted on the long axial track (10).

22. The automatic machine for cleaning wallboards as claimed in claim 21, wherein each magnetic valve (30) has

a valve tube (31) having a tubular inner space (311) having a closed end and an open end, multiple grooves (312) axially formed in an inner sidewall defined around the tubular inner space (311), and multiple through holes (313) radially formed through the valve tube (31) and respectively corresponding to and communicating with the grooves (312);

a magnet (32) mounted in the tubular inner space (311) of the valve tube (31);

a spring (33) mounted around the magnet (32) and disposed in the tubular inner space (311) of the valve tube (31);

a waterproof gasket (34) and a magnetic plate (35) mounted on the open end of the tubular inner space (311) of the valve tube (31) in sequence, the waterproof gasket (34) having a through hole (341), and the magnetic plate (35) having a through hole (351);

wherein the spring (33) constantly pushes the magnet (32) toward the waterproof gasket (34), such that the magnet (32) resiliently abuts the waterproof gasket (34) and selectively seals the through hole (341) of the waterproof gasket (34).

23. The automatic machine for cleaning wallboards as claimed in claim 22, wherein

each of the long axial tracks (10) has an elongated rack (171); and
the main driving device (23) of each of the sliding engine bases (20) has a driving rod and a driving gear (231) securely mounted on the driving rod and engages the elongated rack (171) of the corresponding long axial track (10).

24. The automatic machine for cleaning wallboards as claimed in claim 23, wherein two auxiliary driving devices (71) are respectively disposed beside two ends of each long axial track (10), and each auxiliary driving device (71) has a roller (711) and a pulling element (72) connected to the roller (711) and the sliding engine base (20) that corresponds to the long axial track (10).

25. The automatic machine for cleaning wallboards as claimed in claim 24, wherein

two pivot shafts (74) are rotatably disposed respectively beside the two ends of each long axial track (10) and are perpendicular to the long axial track (10);

the rollers (711) are respectively mounted on the pivot shafts (74);

the pulling element (72) of each auxiliary driving device (71) is connected to the roller (711) and the sliding engine base (20) that corresponds to the long axial track (10); and

each pivot shaft (74) is driven by one auxiliary driving device (71).