US 20040242134A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2004/0242134 A1

Lee (43) Pub. Date: Dec. 2, 2004

(54) DRAG TYPE WHEEL FINISHING MACHINE

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(21) Appl. No.: **10/476,038**

(22) PCT Filed: **Aug. 5, 2003**

(86) PCT No.: **PCT/KR03/01570**

(30) **Foreign Application Priority Data**

Aug. 6, 2002 (KR) 10-2002-0046265

Aug. 6, 2002 (KR) 20-2002-0023487

Publication Classification

(51) **Int. Cl.**[7] **B24B 19/00**

(52) **U.S. Cl.** **451/113**; 451/114

(57) **ABSTRACT**

A drag type wheel finishing machine. A spindle is connected to an output shaft of a drive motor secured to an upper platform of a frame structure. Arms are mounted adjacent to a lower end of the spindle. Upright members are joined to distal ends of the arms. Wheel mounting parts are mounted to lower ends of the upright members, and an abrasive polishing media bath is placed in the frame structure to be raised and lowered by a lift mechanism. The lift mechanism is configured such that the media bath can be guided by four columns and supported by four wires. One ends of the wires are connected to a distal end of a piston rod of a drag type hydraulic cylinder installed on the media bath such that, when the wires are simultaneously pulled via the piston rod, the media bath is raised.

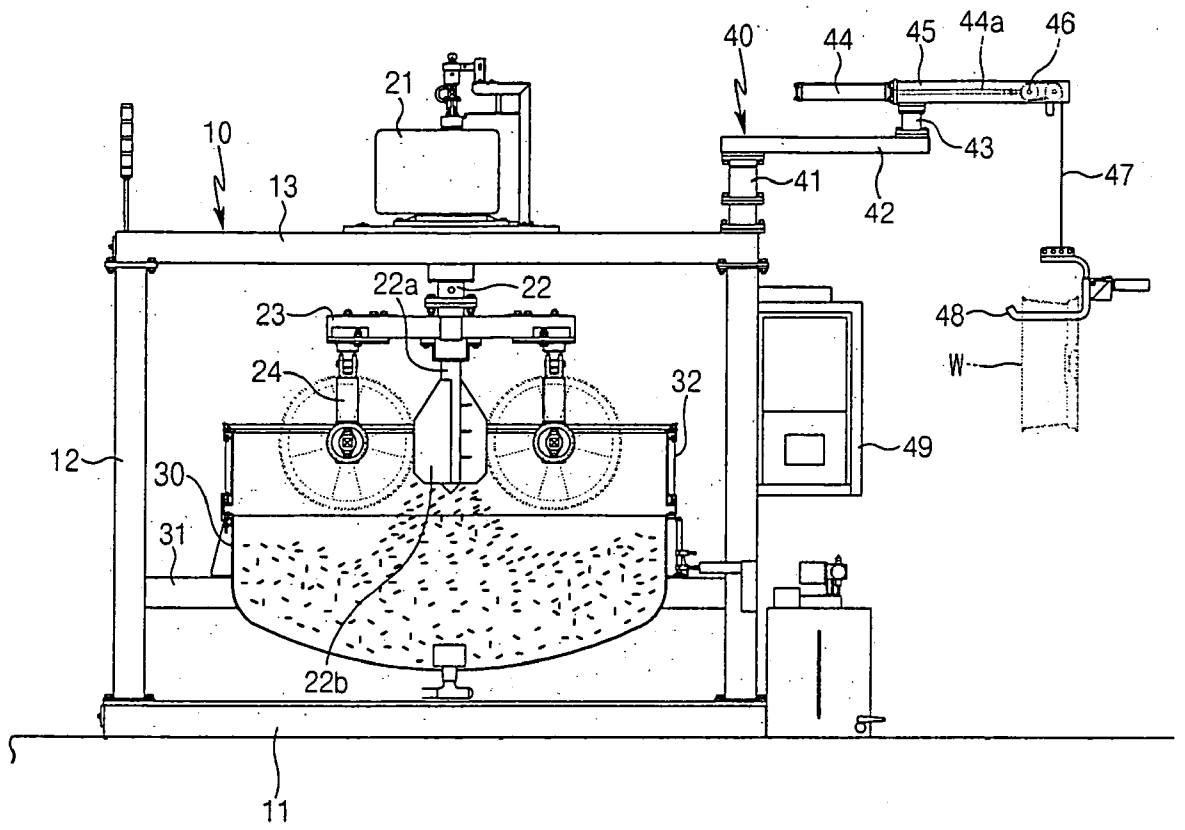

FIG. 1

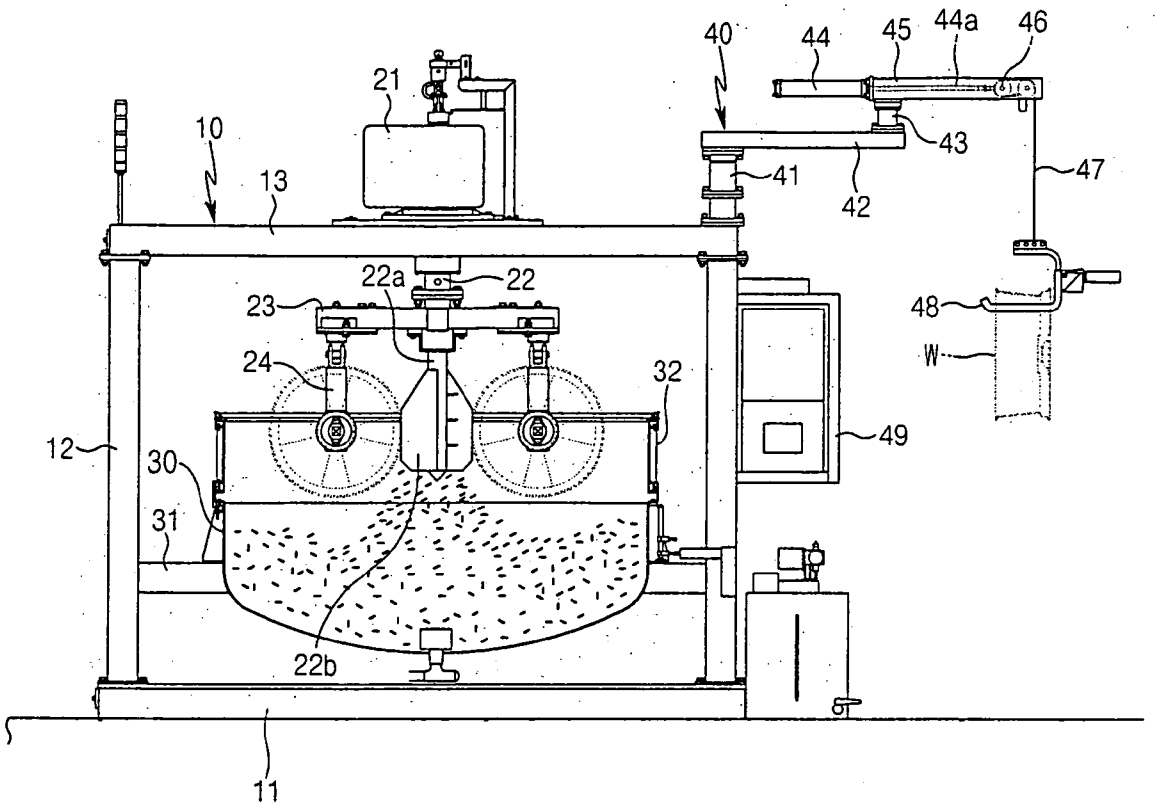
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FIG. 2

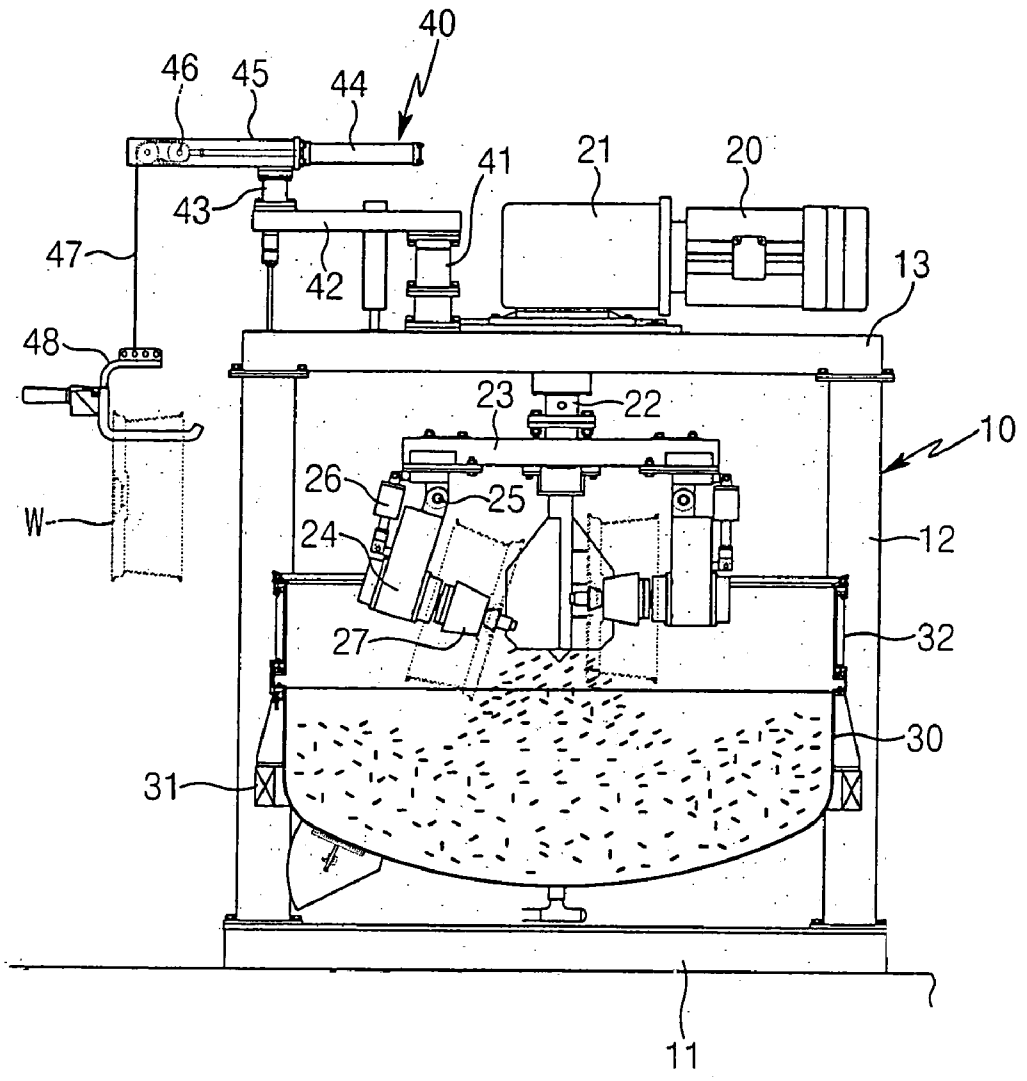


FIG. 3

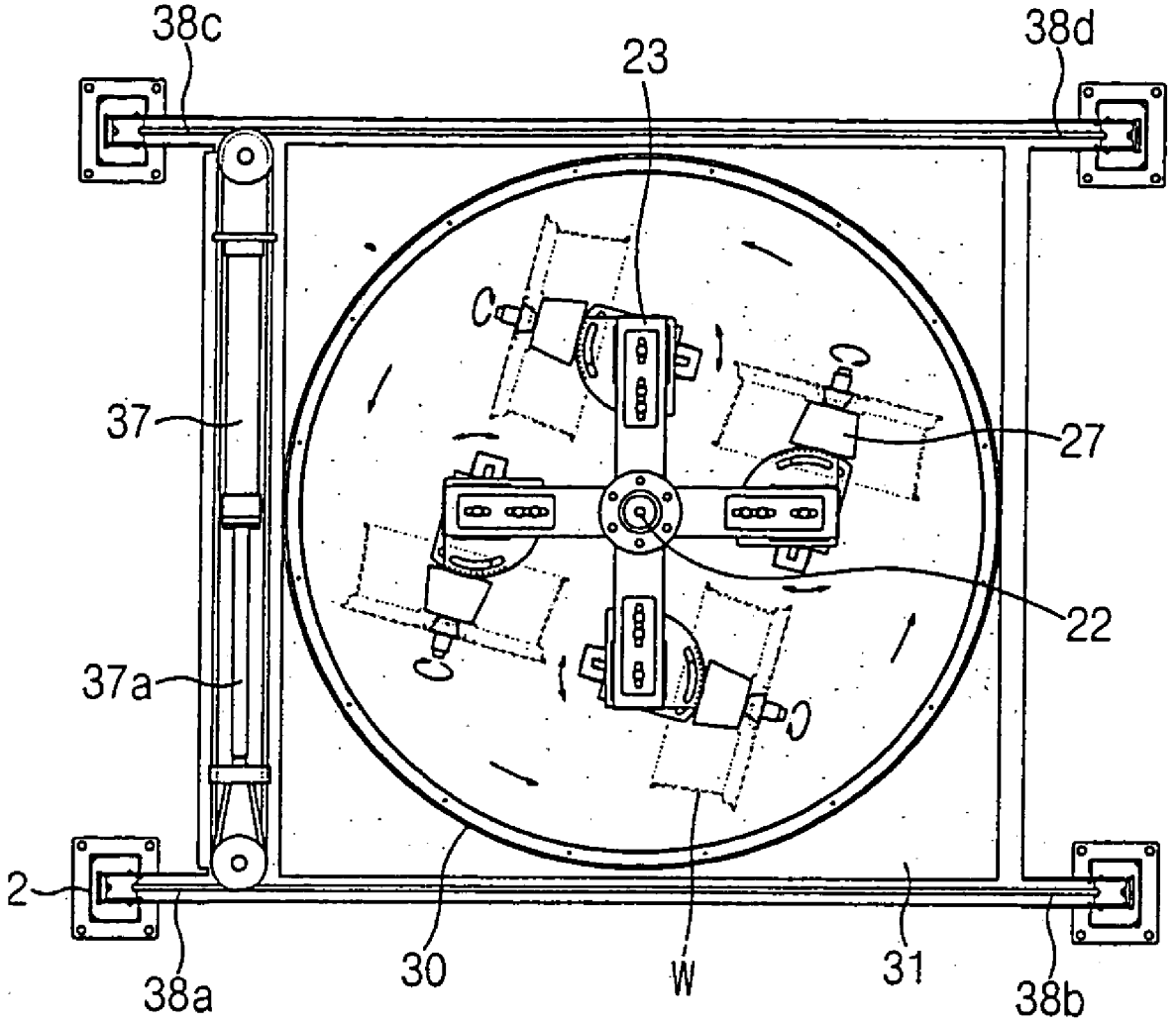


FIG. 4

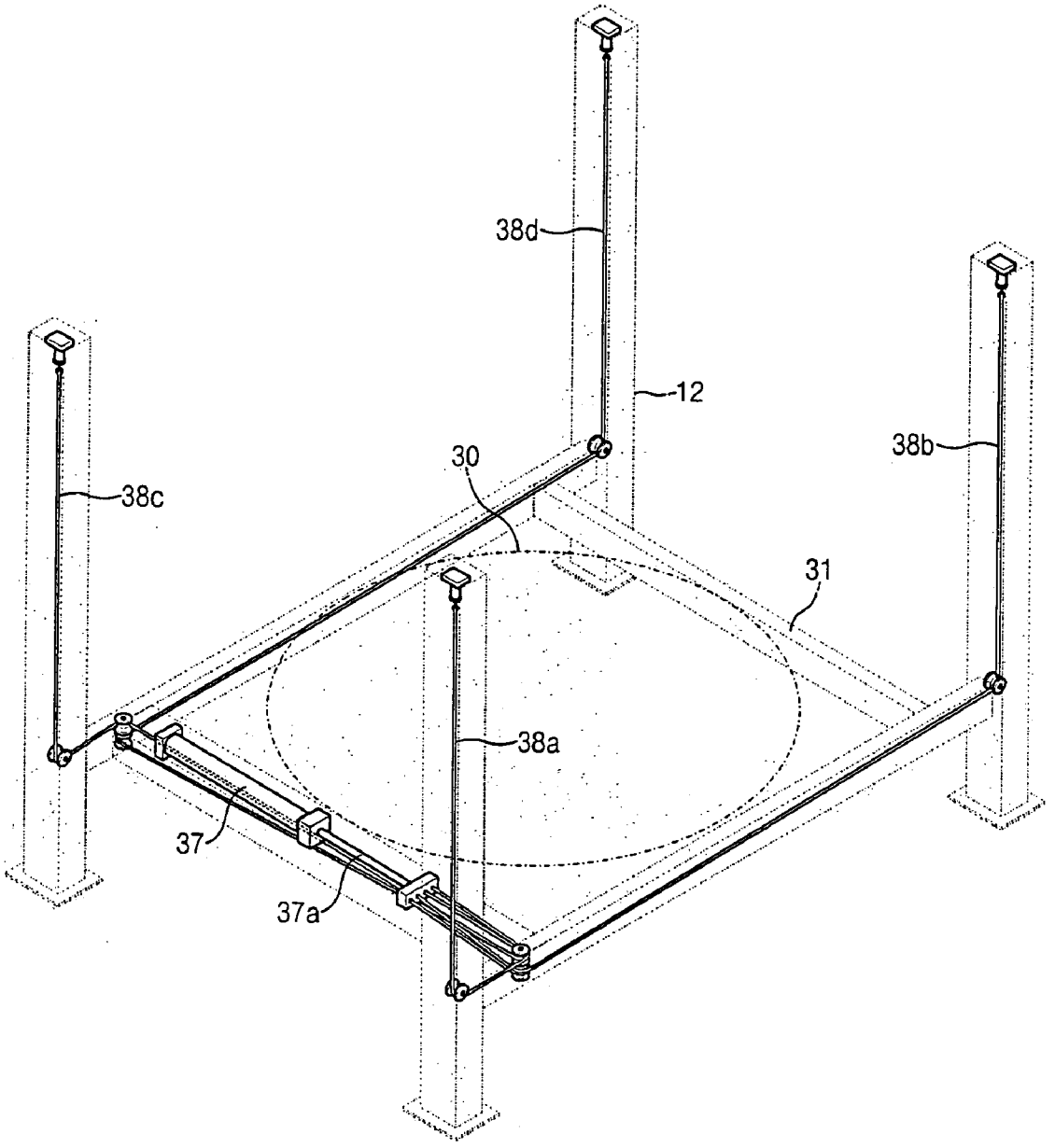


FIG. 5

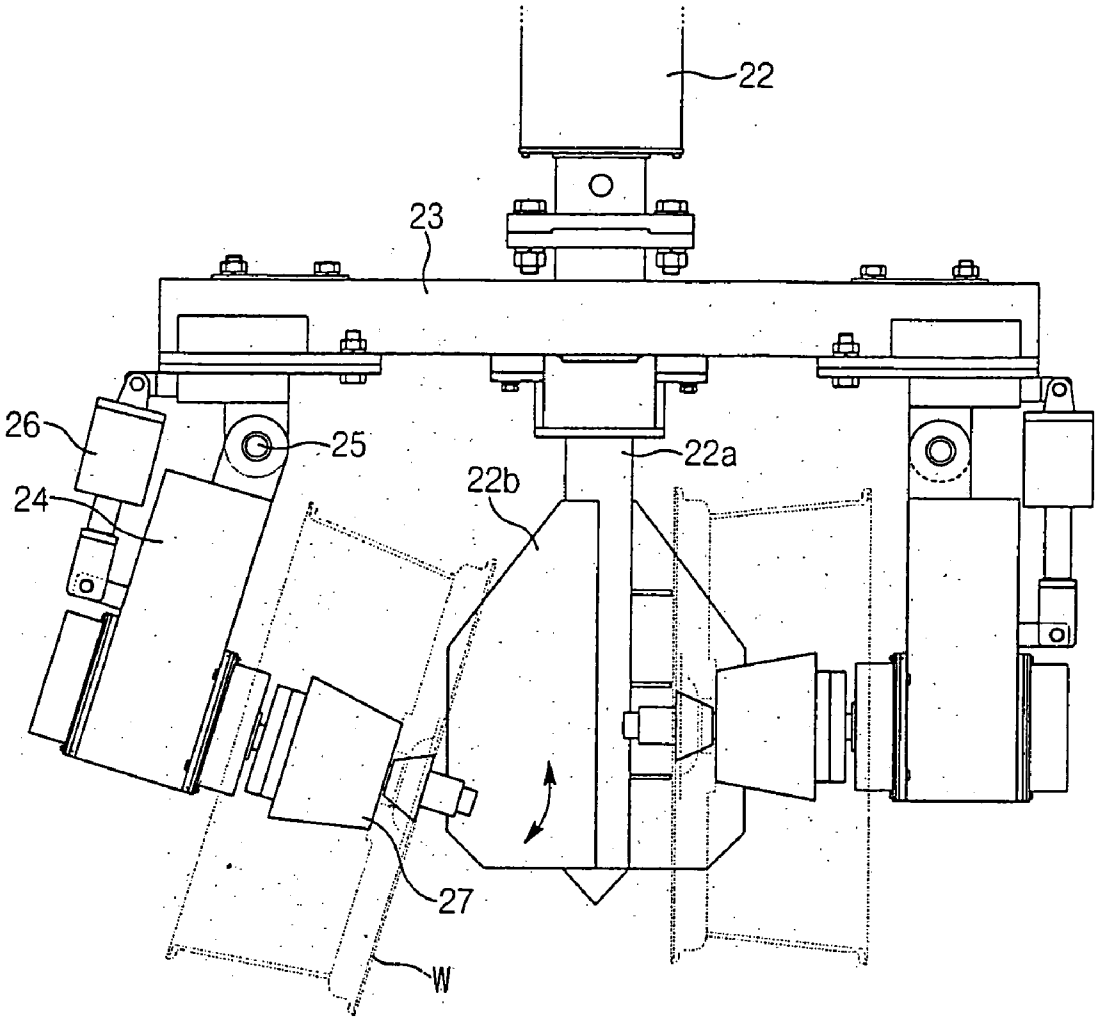


FIG. 6

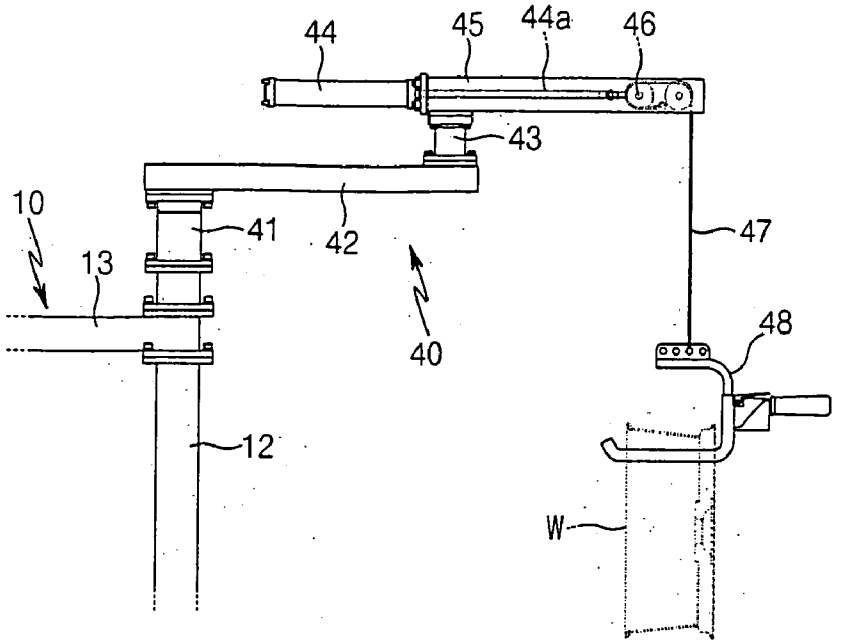


FIG. 7

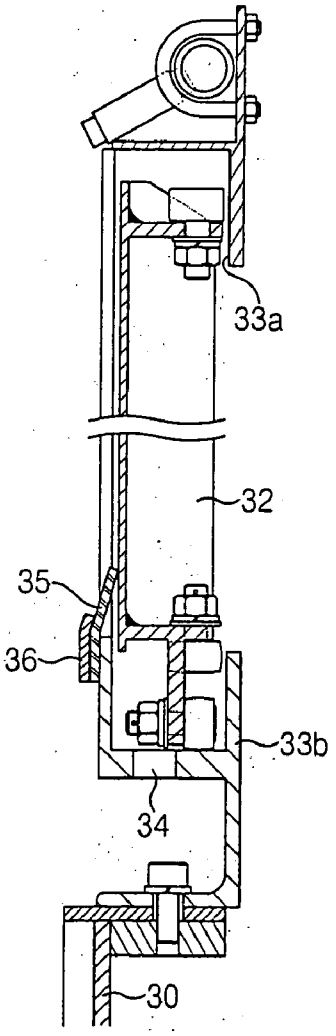
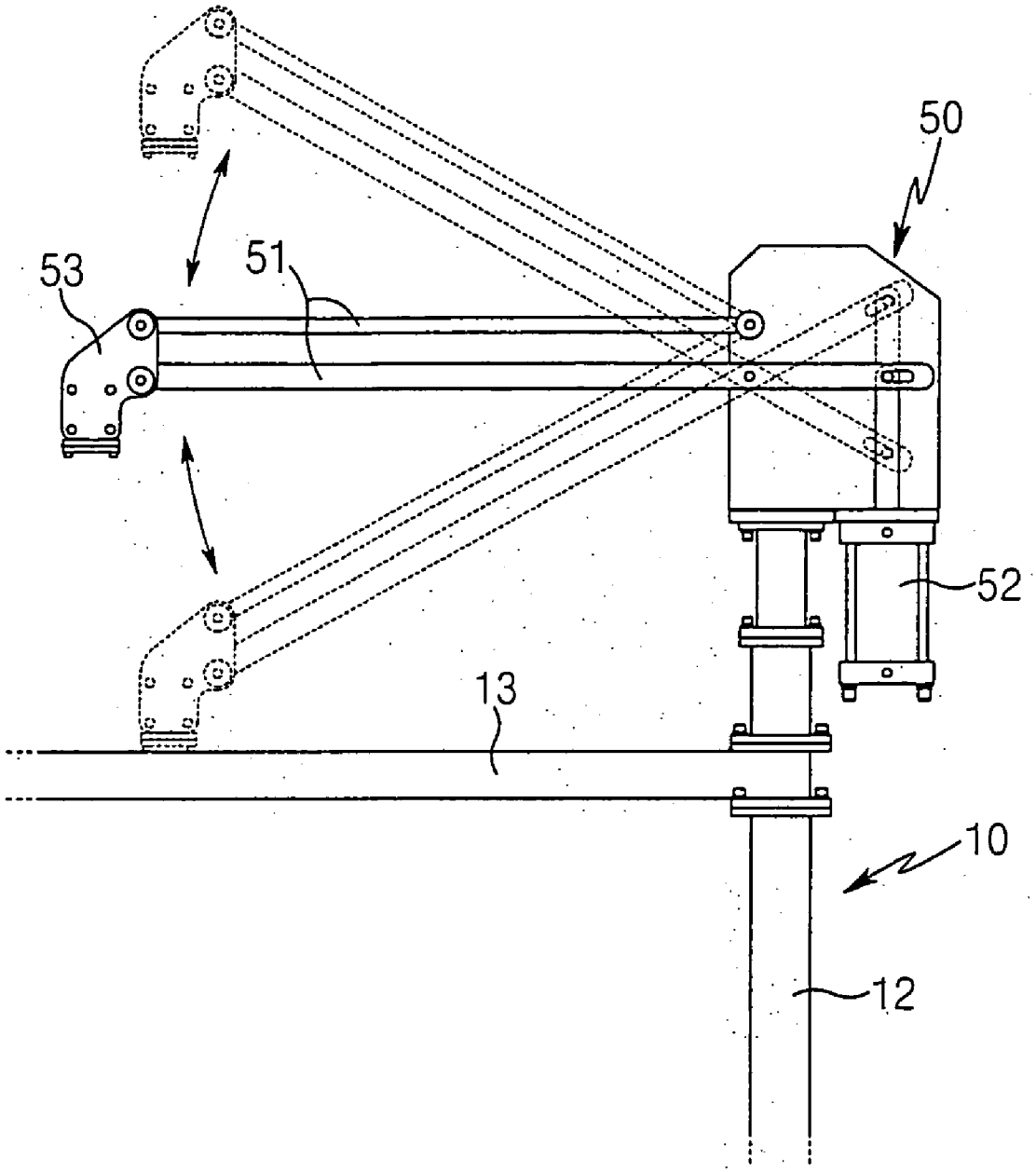


FIG. 8



DRAG TYPE WHEEL FINISHING MACHINE

TECHNICAL FIELD

[0001] The present invention relates, in general, to a drag type wheel finishing machine which polishes the surfaces of automobile wheels, almost perfectly and, more particularly, to a drag type wheel finishing machine which polishes and finishes surfaces of automobile wheels using friction between the surfaces and abrasive polishing media by revolving and rotating the automobile wheels, with a plurality of wheels fully or partially submerged in the abrasive polishing media accommodated in a media bath, thereby rendering a smooth and aesthetically impressive appearance.

BACKGROUND ART

[0002] The popularity of stylized automobile wheels has been largely attributable to their aesthetic enhancement of automobiles, with chrome wheels in particular providing a more stylish, sporty, and expensive look. In order to provide such an aesthetically pleasing appearance, the surface of a wheel must be as smooth as possible before it is coated or plated with a layer of chrome. If the surface is not smooth, the chrome layer applied thereto acts to enhance and magnify any grooves or imperfections remaining on the wheel surface. In the case that the plated chrome layer is exfoliated around a groove, the general appearance of the wheel is significantly detracted.

[0003] Thus, there is a need for a device which may quickly and efficiently remove substantially all grooves and roughness on the surface of a wheel to provide the surface with the desired degree of smoothness.

[0004] A wheel finishing machine related with this technique is disclosed in U.S. Pat. No. 6,406,356. In this conventional wheel finishing machine, an abrasive polishing media bath is installed on columns of a frame in a manner such that it can be raised and lowered by two hydraulic cylinders. A plurality of arms are mounted to a lower end of a vertical spindle which receives power from a drive motor secured to an upper platform of the frame. Upright members, which have wheel mounting shafts at lower ends of them, extend downward from the distal ends of the arms, respectively. The upright members are structured so that they can be rotated with respect to the arms in the range of a predetermined angle.

[0005] The conventional wheel finishing machine constructed as mentioned above suffers from defects as described below.

[0006] First, due to the fact that the media bath is raised and lowered by the two hydraulic cylinders while being guided by the four columns of the frame, it is technically difficult to stably maintain the balance of the media bath, and therefore, the probability of the media bath being tilted to one side is increased.

[0007] Second, while the wheel mounting shafts of the. upright members extending downward from the distal ends of the arms rotated integrally with the spindle can be rotated to less than ninety degrees to thereby be adjusted in its angle with respect to the arms, since the angle adjustment can be implemented only on a horizontal plane, friction between the abrasive polishing media and the wheels cannot be effectively increased as desired.

[0008] Third, because a hinged door is installed on the media bath to allow the wheels to be easily submerged in the media bath and a separate arrangement for preventing leakage of water is not provided, in a state wherein the wheels are mounted to the wheel mounting shafts coupled to the lower ends of the upright members, when the media bath is raised and the spindle is rotated to polish and finish the wheels, a problem is caused in that water leaks between the media bath and the hinged door.

[0009] Fourth, in the conventional wheel finishing machine, any means for mounting the wheels moved adjacent to the frame structure to the wheel mounting shafts coupled to the lower ends of the upright members is not provided. Thus, notwithstanding each of the wheels has a relatively heavy weight, the wheels cannot but be manually mounted to the wheel mounting shafts, and hence, the wheel mounting procedure has proved to be quite tedious, time-consuming, laborious, and thus, very costly.

DISCLOSURE OF THE INVENTION

[0010] Accordingly, an object of the present invention is to solve the above-described problems occurring in the prior art.

[0011] In order to achieve the above object, according to one aspect of the present invention, there is provided a drag type wheel finishing machine in which a spindle extending downward is connected to and rotated integrally with a velocity-reduced output shaft of a drive motor secured to an upper platform of a frame structure, a plurality of arms horizontally extending in respective four directions are mounted adjacent to a lower end of the spindle, upright members are joined to respective distal ends of the arms to extend downward, wheel mounting parts for mounting wheels are mounted to respective lower ends of the upright members, and an abrasive polishing media bath is placed in the frame structure to be raised and lowered by a lift mechanism, wherein the lift mechanism of the abrasive polishing media bath is configured in a manner such that the abrasive polishing media bath can be raised and lowered while being guided by four columns and supported by four wires extending downward from upper ends of the respective columns, and wherein one ends of the wires are connected to a distal end of a piston rod of a drag type hydraulic cylinder installed on the abrasive polishing media bath in a manner such that, when the wires are simultaneously pulled via the piston rod, the abrasive polishing media bath is raised.

[0012] According to another aspect of the present invention, the arms and the upright members are connected with each other by pins in a manner such that the upright members can be pivoted relative to the arms, and upright hydraulic cylinders connect the upright members to the arms in a manner such that the upright members can be adjusted in their respective angular positions.

[0013] According to another aspect of the present invention, a sliding door is installed on the abrasive polishing media bath to be guided in a circumferential direction while being opened and closed, upper and lower guide walls are formed on the abrasive polishing media bath to receive upper and lower ends of the sliding door, respectively, the lower guide wall has a Y-shaped section which has a hole for allowing water that has overflowed onto the lower guide

wall to be returned into the abrasive polishing media bath, and a flexible seal strip to be brought into contact with the sliding door is affixed to an inner surface of the abrasive polishing media bath to reduce an amount of water overflowing onto the lower guide wall.

[0014] According to another aspect of the present invention, rotation wings are formed on the lower end of the spindle and extend downward to reach the same level as the lower ends of the upright members, in a manner such that, when the wheels mounted to the wheel mounting parts of the upright members are rotated, abrasive polishing media collected toward a center of the abrasive polishing media bath can be re-distributed in all directions.

[0015] According to still another aspect of the present invention, the upper platform of the frame structure is provided with a wheel mounting crane for mounting and dismounting the respective wheels to and from the wheel mounting parts; and the wheel mounting crane comprises a first rotation shaft installed on the upper platform to be capable of being horizontally rotated in both directions, a first horizontal lever fastened at one end thereof to the first rotation shaft to extend in a horizontal direction, a second rotation shaft installed on the other end of the first horizontal lever to be capable of being horizontally rotated in both directions, a second horizontal lever fastened at one end thereof to the second rotation shaft and provided with a cylinder, a pulley connected to a distal end of a piston rod of the cylinder adjacent to the other end of the second horizontal lever, and a wheel dragging wire having one end which is secured to the second horizontal lever and the other end which is connected to a wheel hanger, the wheel dragging wire wound on the pulley and extending downward from the other end of the second horizontal lever.

[0016] According to yet still another aspect of the present invention, the upper platform of the frame structure is provided with a wheel mounting crane for mounting and dismounting the respective wheels to and from the wheel mounting parts; and the wheel mounting crane comprises a crane body arranged on the upper platform to be capable of being horizontally rotated in both directions, a quadric wheel moving lever installed on the crane body to be pivoted in upward and downward directions, a crane cylinder secured to the crane body to pivot the wheel moving lever in the upward and downward directions, and a wheel gripper provided to a distal end of the wheel moving lever to selectively grip the wheels.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017] The above and other objects, features and other advantages of the present invention will be more clearly understood from the following detailed description when taken in conjunction with the accompanying drawings, in which:

[0018] **FIG. 1** is a front view illustrating a drag type wheel finishing machine in accordance with an embodiment of the present invention;

[0019] **FIG. 2** is a side view of the drag type wheel finishing machine shown in **FIG. 1**;

[0020] **FIG. 3** is a transverse sectional view of the drag type wheel finishing machine according to the present invention;

[0021] **FIG. 4** is a perspective view independently illustrating a lift mechanism for raising and lowering a media bath, which serves as one main component element of the drag type wheel finishing machine according to the present invention;

[0022] **FIG. 5** is a partial enlarged view illustrating a lower part of a spindle;

[0023] **FIG. 6** is a partial enlarged view illustrating a wheel mounting crane in the drag type wheel finishing machine according to the present invention;

[0024] **FIG. 7** is a partial enlarged view illustrating a door part in the drag type wheel finishing machine according to the present invention; and

[0025] **FIG. 8** is a partial enlarge view illustrating a variation of the wheel mounting crane in the drag type wheel finishing machine according to the present invention.

BEST MODE FOR CARRYING OUT THE INVENTION

[0026] Reference will now be made in greater detail to a preferred embodiment of the invention, an example of which is illustrated in the accompanying drawings. Wherever possible, the same reference numerals will be used throughout the drawings and the description to refer to the same or like parts.

[0027] **FIGS. 1 through 7** are views illustrating a drag type wheel finishing machine in accordance with a preferred embodiment of the present invention.

[0028] As shown in the drawings, the drag type wheel finishing machine includes a frame structure **10**. The frame structure **10** possesses substantially a quadrangular box-shaped configuration. The frame structure **10** has four columns **12** which are erected at four corners, respectively, of the frame structure **10**. An upper platform **13** is provided to upper ends of the columns **12**. A drive motor **20** having a reduction gear box **21** is secured to the upper platform **13**. The drive motor **20** and the reduction gear box **21** constitute one unit. A spindle **22** is coupled to a velocity-reduced output shaft of the reduction gear box **21** to extend downward.

[0029] Below the upper platform **13**, four arms **23** are mounted adjacent to a lower end of the spindle **22** to extend in a horizontal direction. Upright members **24** are connected to distal ends of the arms **23** by means of pins **25** to extend downward. Upright hydraulic cylinders **26** also connect the arms **23** and the upright members **24** with each other to allow for angular adjustments of the upright members **24**. Wheel mounting parts **27** for mounting wheels designated by the reference character 'w' are mounted to respective lower ends of the upright members **24**.

[0030] An extended portion **22***a* is formed on the lower end of the spindle **22** and extends downward to reach the same level as the lower ends of the upright members **24**. Rotation wings **22***b* are formed on the extended portion **22***a* in a manner such that, when the wheels 'w' mounted to the wheel mounting parts **27** of the upright members **24** are rotated, abrasive polishing media collected toward a center of an abrasive polishing media bath **30** can be re-distributed in all directions.

[0031] A lift plate **31** is installed in the frame structure **10** in a manner such that the lift plate **31** can be raised and lowered by a lift mechanism while being guided along the columns **12**. The abrasive polishing media bath **30** is securely inserted through the lift plate **31**. The abrasive polishing media bath **30** has a bottom end which is convexed downward and a top end which is opened.

[0032] As can be readily seen from **FIG. 7**, a pair of arc-shaped sliding doors **32** are provided at one side of the top end of the abrasive polishing media bath **30** in a manner such that they can be opened and closed in a circumferential direction of the abrasive polishing media bath **30**. Upper and lower guide walls **33***a* and **33***b* are formed on the abrasive polishing media bath **30** to receive upper and lower ends of the sliding doors **32**, respectively. The lower guide wall **33***b* has a Y-shaped section which has a hole **34** for allowing water overflowed onto the lower guide wall **33***b* to be returned into the abrasive polishing media bath **30**. A flexible seal strip **35** to be brought into contact with the sliding doors **32** is affixed to an inner surface of the abrasive polishing media bath **30** by means of a fastener strip **36** to reduce an amount of water overflowing onto the lower guide wall **33***b*.

[0033] As shown in **FIG. 4**, in the lift mechanism of the abrasive polishing media bath **30**, a drag type hydraulic cylinder **37** having a piston rod **37***a* is installed on the lift plate **31** in a horizontal direction. Four wires **38***a* through **38***d* are connected at one ends thereof to a distal end of the piston rod **37***a* of the drag type hydraulic cylinder **37** and at the other. ends thereof to the upper ends of the columns **12**. At this time, the lift plate **31** must be appropriately supported in a manner such that the abrasive polishing media bath **30** can be raised and lowered when the piston rod **37***a* of the drag type hydraulic cylinder **37** is operated to simultaneously pull and release the one ends of the respective wires **38***a* through **38***d*.

[0034] A wheel mounting crane **40** is provided on the upper platform **13** at one side of the frame structure **10**, in a manner such that the wheels 'w' moved adjacent to the frame structure **10** can be easily mounted to the wheel mounting parts **27** coupled to the lower ends of the upright members **24**, and the wheels 'w' having undergone a polishing and finishing operation can be easily dismounted form the wheel mounting parts **27**.

[0035] As best shown in **FIG. 6**, in the wheel mounting crane **40**, a first rotation shaft **41** is installed on the upper platform **13** to be capable of being horizontally rotated in both directions, and a first horizontal lever **42** is fastened at one end thereof to the first rotation shaft **41** to extend in a horizontal direction. A second rotation shaft **43** is installed on the other end of the first horizontal lever **42** to be capable of being horizontally rotated in both directions; and a second horizontal lever **45** provided with a cylinder **44** is fastened at one end thereof to the second rotation shaft **43**. A pulley **46** is connected to a distal end of a piston rod **44***a* of the cylinder **44** adjacent to the other end of the second horizontal lever **45**. A wheel dragging wire **47** is secured at one end thereof to the second horizontal lever **45** and connected at the other end thereof to a wheel hanger **48**. The wheel dragging wire **47** is partially wound on the pulley **46** and extends downward from the other end of the second horizontal lever **45**.

[0036] The unexplained reference numeral **49** designates a control box unit for synthetically controlling the drive motor **20** and the respective cylinders.

[0037] In the drag type wheel finishing machine according to the present invention, constructed as mentioned above, if power is applied to start the polishing and finishing operation, a predetermined amount of abrasive polishing media is supplied into the abrasive polishing media bath **30** placed on the lift plate **31**, and then, wheels 'w' are mounted to the respective wheel mounting parts **27** which are anchored to the lower ends of the upright members **24**.

[0038] Describing a procedure for mounting the wheels 'w' to the wheel mounting parts **27** with reference to **FIG. 1**, the control box unit **49** is manipulated to extend the piston rod **44***a* out of the cylinder **44** to thereby lower the wheel hanger **48** connected to the other end of the wheel dragging wire **47** to the ground. Next, in a state wherein the wheel hanger **48** is hooked on the wheel 'w' which is moved adjacent to the frame structure **10**, the cylinder **44** is operated to raise the wheel 'w'. At this time, a worker grasps the wheel hanger **48** on which the raised wheel 'w' is hung and moves the wheel hanger **48** to a position which is close to the wheel mounting parts **27** by rotating the first and second horizontal levers **42** and **44** about the first and second rotation shafts **41** and **43**. Thereupon, by fitting the wheel 'w' around one of the wheel mounting parts **27**, the wheel 'w' is mounted to the wheel mounting parts **27**.

[0039] If the wheels 'w' are mounted to the wheel mounting parts **27** in the above-described way, the drag type hydraulic cylinder **37** constituting the lift mechanism for the abrasive polishing media bath **30** is operated. By this fact, as the piston rod **37***a* of the drag type hydraulic cylinder **37** pulls the four wires **38***a* through **38***d*, the abrasive polishing media bath **30** is raised along with the lift plate **31**. At this time, if the abrasive polishing media bath **30** is fully raised by the drag type hydraulic cylinder **37**, the wheels 'w' which are mounted to the wheel mounting parts **27** coupled to the lower ends of the upright members **24** are held partially submerged into the abrasive polishing media.

[0040] In this state wherein the wheels 'w' are held partially submerged into the abrasive polishing media accommodated in the abrasive polishing media bath **30**, as the drive motor **20** is actuated, the spindle **22** is rotated by way of the reduction gear box **21** of the drive motor **20**. With this, the arms **23**, the upright members **24** and the extended portion **22***a* which are integrated with the spindle **22** are also rotated.

[0041] Accordingly, as the wheels 'w' are revolved: along with the upright members **24**, the wheels 'w' are polished through friction between the wheels 'w' and the abrasive polishing media. Due to this friction between the wheels 'w' and the abrasive polishing media, the wheels 'w' are rotated about their respective wheel mounting parts **27**. In other words, since the wheels 'w' are polished while being simultaneously revolved and rotated, the entire surfaces of the wheels 'w' can be uniformly polished.

[0042] While the wheels 'w' are polished in this way, as the arms **23**, the upright members **24** and the extended portion **22***a* are rotated by the spindle **22**, water which serves as one constituent of the abrasive polishing media accommodated in the abrasive polishing media bath **30** is primarily

prevented from leaking by the presence of the flexible seal strip **35** which are disposed between the abrasive polishing media bath **30** and the doors **32**. In spite of the sealing function rendered by the flexible seal strip **35**, water overflowed onto the lower guide wall **33***b* is returned into the abrasive polishing-media bath **30** through the hole **34** which is defined in the lower guide wall **33***b*. Therefore, leakage of water out of the abrasive polishing media bath **30** is avoided.

[**0043**] Further, since the rotation wings **22***b* which are formed on the extended portion **22***a* of the spindle **22** are also rotated, while the wheels 'w' mounted to the wheel mounting parts **27** coupled to the lower ends of the upright members **24** are rotated at a predetermined separation from the spindle **22**, the abrasive polishing media collected toward the center of the abrasive polishing media bath **30** can be re-distributed in all directions, as a result of which uniform polishing of the wheels 'w' can be ensured and a polishing time can be shortened.

[**0044**] In the course of polishing the wheels 'w', if the control box unit **49** is manipulated to operate the upright hydraulic cylinders **26**, as piston rods of the upright hydraulic cylinders **26** are extended and retracted out of and into the upright hydraulic cylinders **26**, the upright members **24** are rotated about the pins **25**. Due to this fact, because the wheels 'w' mounted to the wheel mounting parts **27** coupled to the lower ends of the upright members **24** are also rotated, it is possible to rotate the wheels 'w' to an optimal angle with respect to the arms **23**. Therefore, since the friction between the wheels 'w' and the abrasive polishing media bath **30** is effectively promoted, polishing efficiency of the wheels 'w' is improved, and due to this fact, it is possible to complete the polishing and finishing operation within a short period of time.

[**0045**] If the polishing and finishing operation for the wheels 'w' is completed, the control box unit **49** is manipulated so that the piston rod **37***a* of the drag type hydraulic cylinder **37** installed on the lift plate **31** is extended out of the drag type hydraulic cylinder **37**, by which the lift plate **31** is lowered along with the abrasive polishing media bath **30**. Thereafter, the wheels 'w' are dismounted using the wheel mounting crane **40** from the wheel mounting parts **27** coupled to the lower ends of the upright members **24**. A procedure for dismounting the wheels 'w' from the wheel mounting parts **27** using the wheel mounting crane **40** is performed in a reverse order to the above-described wheel mounting procedure.

[**0046**] **FIG. 8** is a partial enlarge view illustrating a variation of the wheel mounting crane in the drag type wheel finishing-machine according to the present invention. In the wheel mounting crane, a crane body **50** is arranged on the upper platform **13** of the frame structure **10** to be capable of being horizontally rotated in both directions. A quadric wheel moving lever **51** is installed on the crane body **50** to be pivoted in upward and downward directions. A crane cylinder **52** is secured to the crane body **50** to pivot the wheel moving lever **51** in the upward and downward directions, and a wheel gripper **53** is provided to a distal end of the wheel moving lever **51** to selectively grip the wheels 'w'.

[**0047**] In the wheel mounting crane constructed as mentioned above, first, by operating the crane cylinder **52**, the wheel gripper **53** is raised or lowered to hold the wheel 'w'. Then, by operating again the crane cylinder **52**, the wheel 'w' is raised. Next, as a worker pushes the wheel 'w' to a desired position, the crane body **50** is rotated, and thereby, it is possible to mount and dismount the wheels 'w' to and from the wheel mounting parts **27** of the upright members **24**.

[**0048**] Industrial Applicability

[**0049**] As apparent from the above description, the drag type wheel finishing machine according to the present invention, constructed as mentioned above, provides advantages in that a media bath along with a lift structure is guided by four columns and supported by four wires which extend downward from upper ends of the respective columns, and one ends of the four wires are connected to a distal end of a piston rod of a drag type hydraulic cylinder. Therefore, it is possible to stably maintain the balance of the media bath.

[**0050**] Further, due to the fact that a sliding door is installed on the media bath, space occupation can be diminished when opening and closing the door. Therefore, a sufficient work space can be secured, and leakage of water between the media bath and the door is effectively prevented. Also, in the present invention, because upright members are connected to arms by means of pins and hydraulic cylinders connect the upright members to distal ends of the arms, a wheel mounting angle, that is, a wheel polishing angle can be adjusted, whereby it is possible to conduct a polishing operation under a condition where friction between abrasive polishing media and the wheels is maximized and an optimal polishing angle is maintained.

[**0051**] Moreover, in the present invention, by the fact that rotation wings are formed on a lower end of a spindle which is positioned centrally of the plurality of upright members, while the wheels mounted to wheel mounting parts coupled to lower ends of the upright members are revolved and rotated, the abrasive polishing media collected toward a center of the media bath can be re-distributed in all directions, whereby the wheel polishing and finishing operation can be uniformly implemented.

[**0052**] Furthermore, since a crane which employs a cylinder is installed at a side of a frame structure, it is possible to simply and conveniently mount and dismount the wheels to and from wheel mounting shafts of the wheel mounting parts.

[**0053**] Although the preferred embodiments of the present invention have been disclosed for illustrative purposes, those skilled in the art will appreciate that various modifications, additions and substitutions are possible, without departing from the scope and spirit of the invention as disclosed in the accompanying claims.

1. A drag type wheel finishing machine in which a spindle extending downward is connected to and rotated integrally with a velocity-reduced output shaft of a drive motor secured to an upper platform of a frame structure, a plurality of arms horizontally extending in respective four directions are mounted adjacent to a lower end of the spindle, upright members are joined to respective distal ends of the arms to extend downward, wheel mounting parts for mounting wheels are mounted to respective lower ends of the upright members, and an abrasive polishing media bath is placed in the frame structure to be raised and lowered by a lift mechanism, wherein the lift mechanism of the abrasive polishing media bath is configured in a manner such that the

abrasive polishing media bath can be raised and lowered while being guided by four columns and supported by four wires extending downward from upper ends of the respective columns, and wherein one ends of the wires are connected to a distal end of a piston rod of a drag-type hydraulic cylinder installed on the abrasive polishing media bath in a manner such that, when the wires are simultaneously pulled via the piston rod, the abrasive polishing media bath is raised.

2. The machine as set forth in claim 1, wherein the arms and the upright members are connected with each other by pins in a manner such that the upright members can be pivoted relative to the arms, and upright hydraulic cylinders connect the upright members to the arms in a manner such that the upright members can be adjusted in their respective angular positions.

3. The machine as set forth in claim 1, wherein a sliding door is installed on the abrasive polishing media bath to be guided in a circumferential direction while being opened and closed, upper and lower guide walls are formed on the abrasive polishing media bath to receive upper and lower ends of the sliding door, respectively, the lower guide wall has a Y-shaped section which has a hole for allowing water that has overflowed onto the lower guide wall to be returned into the abrasive polishing media bath, and a flexible seal strip to be brought into contact with the sliding door is affixed to an inner surface of the abrasive polishing media bath to reduce an amount of water overflowing onto the lower guide wall.

4. The machine as set forth in claim 1, wherein rotation wings are formed on the lower end of the spindle and extend downward to reach the same level as the lower ends of the upright members, in a manner such that, when the wheels mounted to the wheel mounting parts of the upright members are rotated, abrasive polishing media collected toward a center of the abrasive polishing media bath can be redistributed in all directions.

5. The machine as set forth in claim 1, wherein the upper platform of the frame structure is provided with a wheel mounting crane for mounting and dismounting the respective wheels to and from the wheel mounting parts; and wherein the wheel mounting crane comprises a first rotation shaft installed on the upper platform to be capable of being horizontally rotated in both directions, a first horizontal lever fastened at one end thereof to the first rotation shaft to extend in a horizontal direction, a second rotation shaft installed on the other end of the first horizontal lever to be capable of being horizontally rotated in both directions, a second horizontal lever fastened at one end thereof to the second rotation shaft and provided with a cylinder, a pulley connected to a distal end of a piston rod of the cylinder adjacent to the other end of the second horizontal lever, and a wheel dragging wire having one end which is secured to the second horizontal lever and the other end which is connected to a wheel hanger, the wheel dragging wire wound on the pulley, and extending downward from the other end of the second horizontal lever.

6. The machine as set forth in claim 1, wherein the upper platform of the frame structure is provided with a wheel mounting crane for mounting and dismounting the respective wheels to and from the wheel mounting parts; and wherein the wheel mounting crane comprises a crane body arranged on the upper platform to be capable of being horizontally rotated in both directions, a quadric wheel moving lever installed on the crane body to be pivoted in upward and downward directions, a crane cylinder secured to the crane body to pivot the wheel moving lever in the upward and downward directions, and a wheel gripper provided to a distal end of the wheel moving lever to selectively grip the wheels.

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