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CLEANING HEAD FOR BLACKBOARD RENOVATORS

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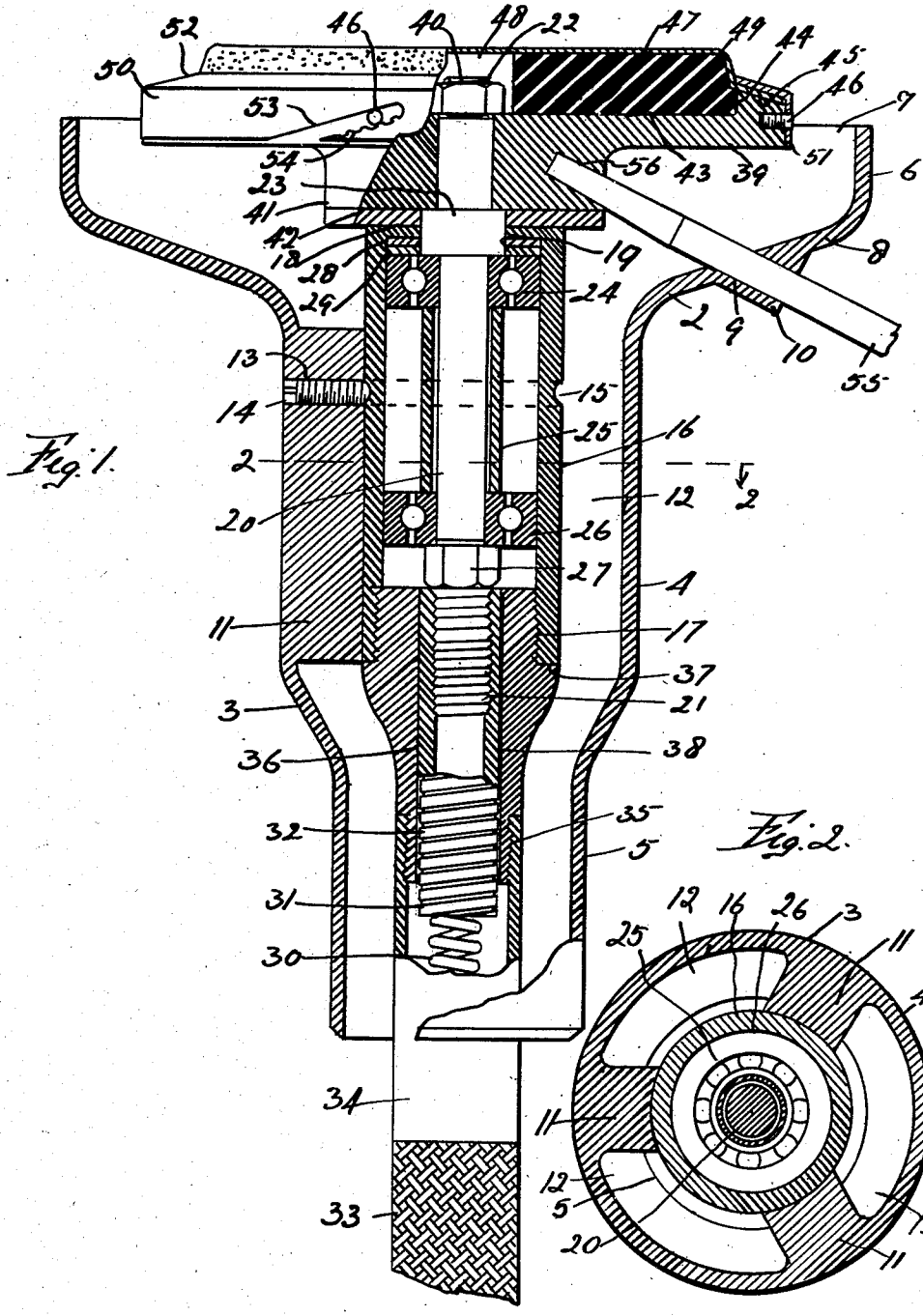


Fig. 1.

Fig. 2.

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CLEANING HEAD FOR BLACKBOARD RENOVATORS.

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My invention relates to new and useful improvements in a cleaning head for blackboard renovators, and has for its primary object to provide such a device embodying a casing or jacket for connection with a suction device and a rotary member within said casing adapted to carry interchangeable cleaning devices.

Another object of this invention is to provide a simple and improved means for detachably holding the removable cleaning devices on the rotary member.

Another object of the invention is to provide simple and effective means for holding the rotating member in a stationary position relative to the casing when removing or replacing the cleaning devices.

A further object of the invention is to provide for forcing foreign matter from the bearings, said means tending to move grease or foreign substances toward the sheath about the flexible shaft.

Still another object of the invention is to provide a unitary structure for the bearing of the rotating member so that said rotating member and component parts with the bearing may be removed as a unit and then the several component parts disassembled.

A still further object of my invention is to improve the construction and arrangement of all the parts in order to provide a compact, strong and relatively light cleaning head.

With these ends in view, this invention consists in the details of construction and combination of elements hereinafter set forth and then specifically designated by the claims.

In order that those skilled in the art to which this invention appertains, may understand how to make and use the same, I will describe its construction in detail, referring by numerals to the accompanying drawing forming a part of this application, in which:—

Fig. 1, is a longitudinal sectional view of a cleaning head for blackboard renovators illustrating the embodiment of my invention with parts of said cleaning head shown in elevation for convenience of illustration.

Fig. 2, is a section at the line 2—2 of Fig. 1.

In carrying out my invention as here embodied, 2 represents a head for the blackboard renovator as a whole and includes a casing or jacket 3 constructed of generally tubular formation open at both ends and consisting of a body 4 from one end of which projects a reduced shank 5 and from the opposite end projects the enlarged bell 6 to produce a mouth 7 for the entrance of particles drawn into the casing or jacket by means of a suitable suction device connected in any suitable manner with the casing or jacket as by a flexible tube or conduit, slipped over the shank 5. The rear wall 8 of the bell 6 is preferably flared outward or is of outwardly divergent formation and in this wall 8 of the bell is formed a hole 9 for a purpose to be later described and if found desirable said wall may be strengthened in the locality of said hole by the formation of a lug 10. Within the body portion 4 are formed a plurality of longitudinal ribs 11, preferably three in number, spaced about the inner circumference of said body portion so as to form the passageways 12 between the several ribs as plainly shown in Fig. 2. In the body portion, and preferably in the region of one of the ribs is formed a threaded hole 13 in which is positioned the set screw 14 for coaction with the annular exterior groove 15 intermediate the ends of the barrel 16 for positioning said barrel lengthwise and holding the same stationary between the ribs 11, as plainly shown in Fig. 2.

The barrel 16 is open at its inner end where it is internally threaded as indicated at 17 while the outer end is partially closed by an end wall or inturned flange 18 in which is provided a hole 19. In this barrel is located the stub or rigid shaft 20 having a threaded inner end 21, a threaded outer end 22 and a collar 23 adjacent said outer end, which collar is located in the hole 19 but is of sufficient width or thickness that one face projects outside and the other face inside of the end wall 18. On the rigid shaft between the collar 23 and the inner end of said shaft is mounted a ball bearing 24 so as to abut the inner face of said collar 23 in cooperative relation to the shaft and barrel and as said ball bearing is of usual construction including two rings and balls it will not be described in de il. A tubular spacer washer 25 surrounds the shaft 20 with one end in engagement with the ball bearing 24 while another ball bearing 26, exactly like the bearing 24, surrounds the rigid shaft and engages the opposite end of the tubular spacer washer and these parts are held in place by a nut 27 having threaded engage-

ment with the threaded inner end 21 of the shaft. In order to fill the space between the end wall or flange 18 of the barrel 16 and the outermost bearing 24 a compressible washer 28 is interposed between said end wall 18 and a metallic washer 29 coacting with the outer face of the bearing 24.

The reference numeral 30 represents a flexible shaft of any well known make or construction to an end of which is fixed one end of a tubular connector 31 while the opposite end of said connector is internally threaded for threaded connection with the rigid shaft 20 by means of its threads 21 and said tubular connector is provided with an external spiral groove 32 which acts as a conveyer to urge any matter outward with relation to the lower end of the barrel 16 as will be hereinafter more fully explained.

The flexible shaft 30 is surrounded by a flexible sheath 33, generally constructed of latticed or interlaced metal strips and one end of this sheath is fixed to the tubular terminal 34 having threaded connection, as indicated at 35 with the smaller end of the reducing coupling 36 which in turn has threaded connection with the inner end of the barrel 16 by means of its threads 17 and the end of said reducing coupling which connects with the barrel 16 is preferably reduced in diameter to form the shoulder 37 which will engage the inner end of the barrel 16 and thereby determine the position of the coupling relative to the barrel. The coupling has a bore 38 in which the connector 31 snugly fits and therefore any matter which may attempt to enter the coupling will not be carried back into the sheath 16 of the terminal by means of the spiral conveying groove 32 as will be obvious.

On the outer end of the stub shaft 20 is fitted the rotating disc 39, clamped solidly against the collar 23 of the shaft by means of a nut 40 screwed onto the threaded end 22 and this rotating disc preferably is provided with a hub 41 which engages the collar 23. Between the disc, and more particularly its hub, and the end wall or flange 18 of the barrel is interposed a compressible washer 42, such as a felt washer, to occupy the space between the end wall 18 and the rotating disc and prevent the accumulation or entrance of dust or other foreign matter about the working parts.

The rotating disc has a central cavity 43 thereby providing an annular flange 44 at right angles to the main portion of the disc and a face of this flange is beveled or inclined as at 45. About the periphery of the rotating disc are located a plurality of spaced radial pins 46.

In the cavity 43 is located a compressible backing member 47 of sponge rubber which is of sufficient thickness to project considerably beyond the beveled face of the annular flange and said backing member has an aperture 48 for registration with the outer end of the rigid shaft and the nut thereon. A flexible abrasive disc 49 is placed over the exposed portion of the backing member 47 with its outer edge forming a skirt resting on the beveled face of the annular flange where it is clamped by means of the clamping ring 50 which includes the annulus 51 to surround the perimeter of the rotating disc and the inclined flange 52 which corresponds to the beveled face of the annular flange on the disc and in order to detachably connect the clamping ring to the rotating disc the annulus thereof is provided with a plurality of inclined slots 53 corresponding in number to the pins 46 and positioned for cooperation therewith so that after the backing member and an abrasive disc are positioned and the clamping ring placed thereover so that the entrances to the slots 53 register with the pins 46 a slight turn of the clamping ring will draw its flange tightly down upon the skirt of the abrasive disc and thus clamp the parts against the beveled face of the annular flange on the rotating disc. In order to insure holding the clamping ring in position on the rotating disc an edge of the annulus wall in the region of each inclined slot 53 is serrated as at 54.

The flexible backing member 47 must be sufficiently resilient as to be readily compressible and tend to force the abrasive disc outward when the latter is clamped in place so as to keep the serrations 54 in engagement with the pins 46 for holding the clamping ring on the rotating disc and also to cause the abrasive disc to enter depressions in the blackboard surface being cleaned.

To place the clamping ring upon the rotating disc or remove it therefrom, it is necessary to hold said rotating disc stationary which is accomplished by passing the holding rod 55 through the hole 9 in the rear wall of the casing bell and inserting the inner end of said holding rod in the hole 56 formed in the rotating disc, and more particularly in the hub of said disc, said hole being so arranged as to align with the hole 9 and while I have shown but one hole 56 it will be understood that two or more of these might be provided without departing from the invention.

From the foregoing description it will be obvious to persons familiar with this art that when the holding rod 55 is in the position illustrated the rotating disc 39 will be held stationary relative to the casing or jacket 3 by turning the clamping ring 50 in the proper direction the latter may be placed upon or removed from the rotating disc which will permit the placement, removal or renewal of the abrasive disc. When the device is in use the holding pin 55 is entirely removed and the rotating disc is re-

volved by a suitable prime mover transmitting its motion through the flexible shaft 30, its connector 31 and the rigid shaft 20. As the working face of the abrasive disc is at right angles to the axis of rotation the cleaning head is held against a blackboard with the axial center of the head at right angles to the blackboard surface. During the cleaning operations the dirt, dust, particles of blackboard and other foreign substances will be dislodged and drawn into the bell of the jacket by means of the suction device with which said jacket is connected, after which it will be carried off through the passageways 12 between the ribs 11 in the body of the jacket and then through the shaft of said jacket to a suitable conduit through which it passes to a suitable receptacle.

It is to be understood that when the conduit is connected with the jacket the flexible shaft and its sheath are enclosed by the conduit. By removing the set screw 14 the casing or jacket 3 may be forced back over the flexible shaft and its sheath a sufficient distance to obtain access to the coupling 36 so that it may be screwed out of the barrel 16. After this has been done the coupling 36 may be moved away from the barrel by slightly distending the flexible shaft and simultaneously compressing the sheath 33 which will make connector 31 accessible so that it may be removed from the rigid shaft 20. The parts being thus disconnected the barrel 16 with the rotating disc and their component parts may be separated from the casing or jacket and the latter also withdrawn from the flexible shaft and its component parts.

If it is desired to disassemble the bearings then the nut 40 is removed so that the rotating disc can be withdrawn from the outer end of the rigid shaft and then said rigid shaft with the bearings intact can be withdrawn from the inner end of the barrel. When this has been done the nut 27 may be removed and the bearings slipped off of the rigid shaft along with the spacer washer 25.

Of course I do not wish to be limited to the exact details of construction as herein shown as these may be varied within the limits of the appended claims without departing from the spirit of my invention.

Having thus fully described my invention, what I claim as new and useful is:—

1. A blackboard renovator comprising a casing having a bell mouth and adapted to be connected to a suction device, inwardly extending ribs in the casing spaced apart to form passages, a barrel supported between the ribs and detachably connected with one rib, a shaft, bearings for the same in the barrel, a disk connected with the shaft, said disk projecting through the bell mouth of the casing, a cleaning medium carried by the disk and a flexible shaft connected with the first mentioned shaft.

2. A blackboard renovator comprising a casing having a bell mouth at one end and a reduced part at its other end, said reduced part being adapted to receive a suction hose, a barrel within the casing, ribs extending inwardly from the walls of the casing for supporting the barrel and spaced apart to form passages, a shaft rotatably mounted in the barrel, bearings in the barrel for the shaft, a cleaner disk connected with the outer end of the shaft and positioned within the bell mouth, a flexible shaft, a connector for connecting the same with the inner end of the first mentioned shaft, said connector having exterior spiral grooves therein, a coupling member surrounding the connector and fastened to the inner end of the barrel and a sheath surrounding the flexible shaft and connected with the rear end of the coupling member.

In testimony whereof, I have hereunto affixed my signature.

ALBERT P. BENNINGTON.