Aug. 30, 1966 F. P. HEALY 3,269,381

DRESSING ASSEMBLY FOR GRINDING MACHINE

Filed May 3, 1963

4 Sheets-Sheet 1

Fig. 1.

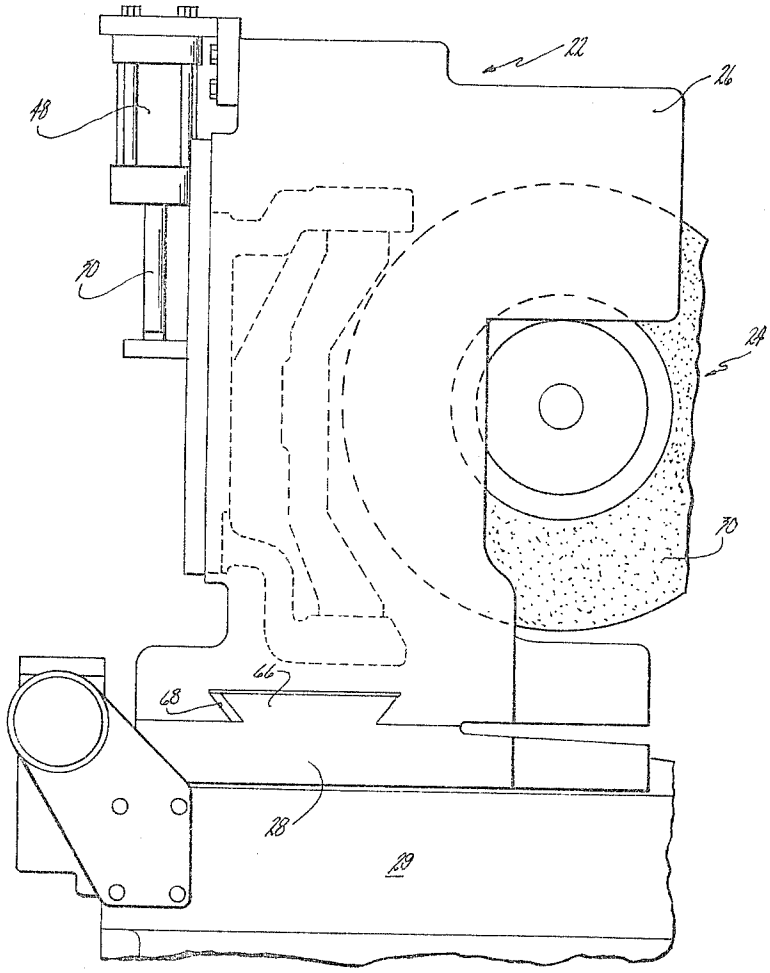


Fig. 4a



Fig. 4b

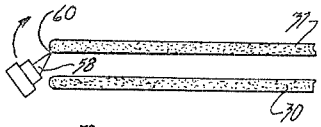


Fig. 4c

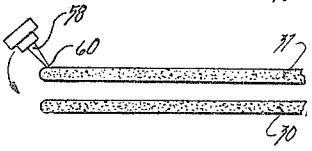


Fig. 4d

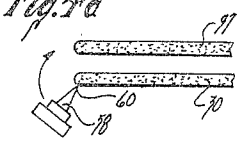


Fig. 4e

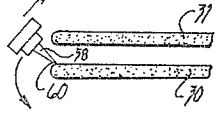
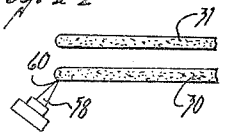


Fig. 4f



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DRESSING ASSEMBLY FOR GRINDING MACHINE

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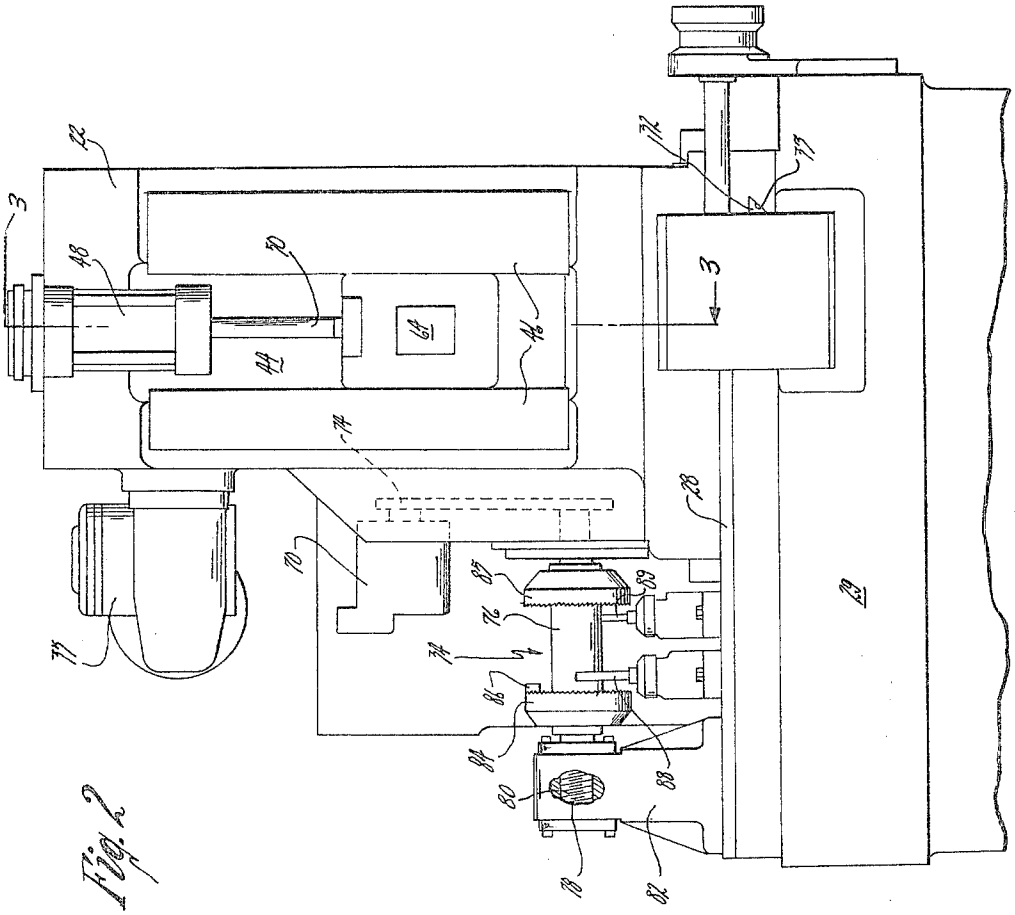


Fig. 2

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Fig. 3.

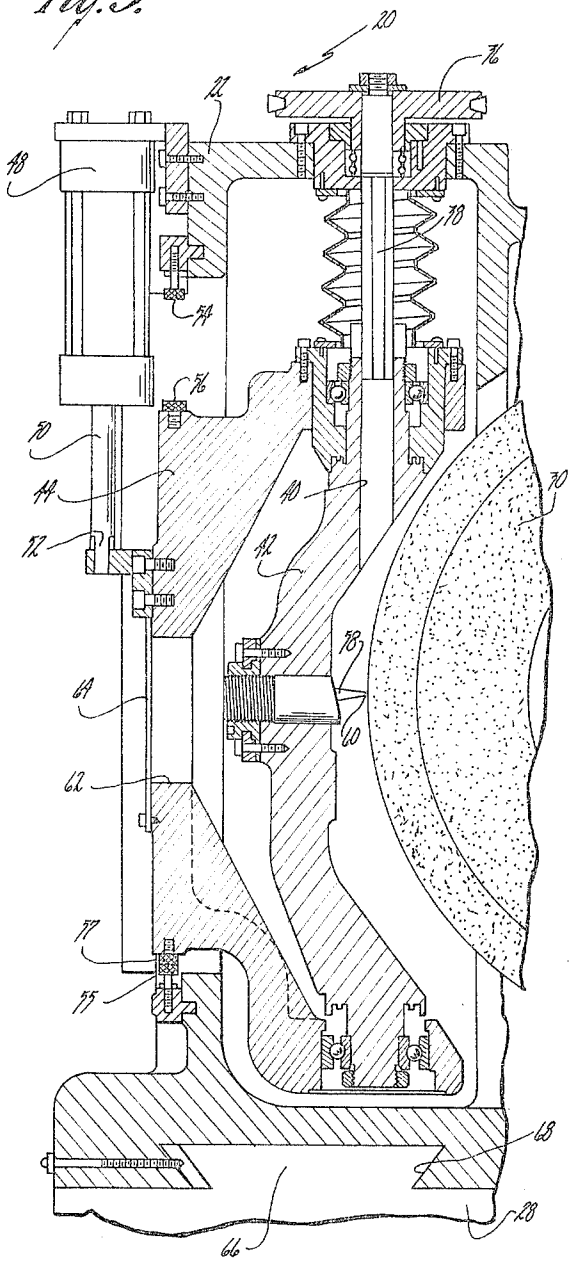


Fig. 5a.

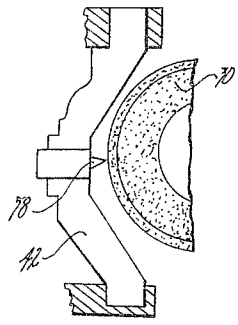


Fig. 5b

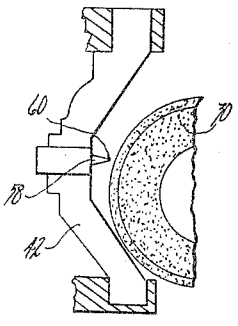
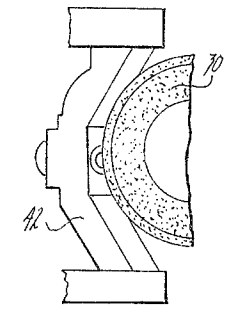


Fig. 5c



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Fig. 6

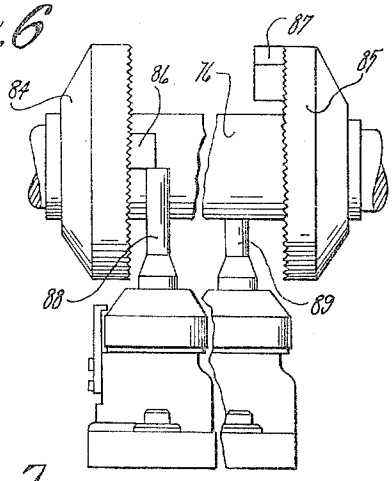


Fig. 7

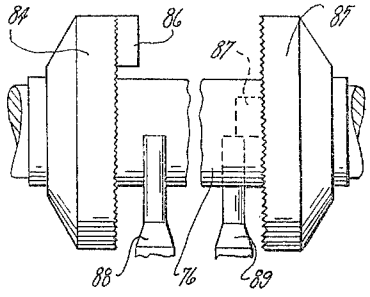


Fig. 8

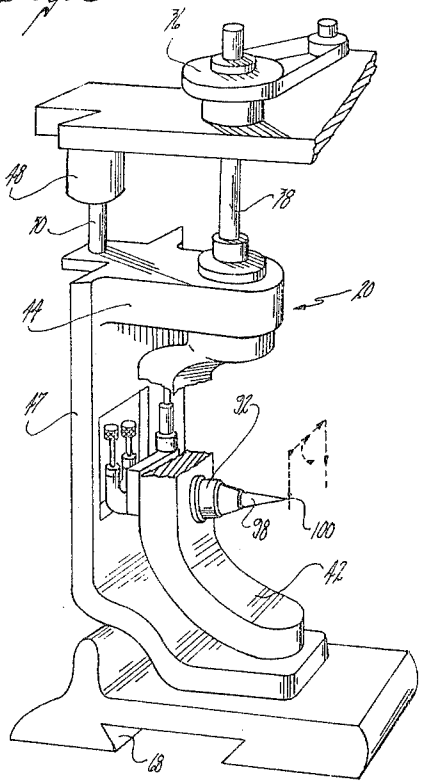


Fig. 9

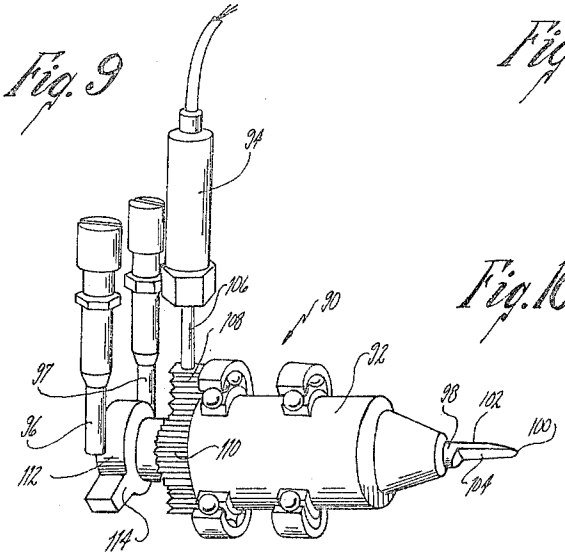


Fig. 11

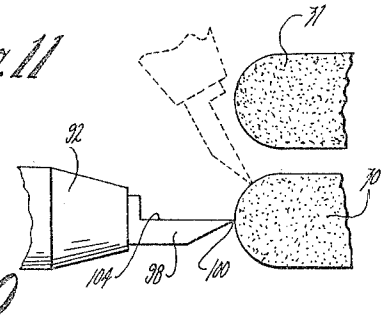
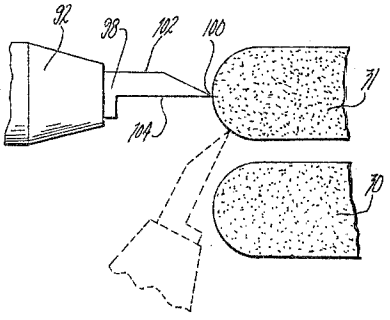


Fig. 10



United States Patent Office 3,269,381 Patented August 30, 1966

3,269,381

DRESSING ASSEMBLY FOR GRINDING MACHINE

Francis P. Healy, Springfield, Mass., assignor to Universal American Corporation, Springfield, Mass., a corporation of Delaware

Filed May 3, 1963, Ser. No. 277,752
11 Claims. (Cl. 125—11)

This invention relates to grinding machines and more specifically to a wheel dresser mechanism for a multiple wheel centerless grinder.

It is the general object of the invention to provide a novel wheel dresser mechanism for a centerless grinder which is particularlly adapted for dressing a plurality of relatively closely spaced coaxial grinding wheels and which incoporates only a single dressing tool to dress the peripheral edge portion of each of the wheels in a predetermined sequence and to a predetermined contour; which incoporates elevating means permitting vertical movement of the dressing tool holder and tool while in dressing relation with the grinding wheels; and which also includes a positioning assembly to control the horizontal movement of the dresser assembly as the dressing tool is moved from one wheel to the other; and to further provide a novel tool holder assembly adapted to rotate the wheel dressing tool to permit more efficient and effective dressing of closely spaced, adjacent wheels with only a single dressing tool.

The drawings show a preferred embodiment of the invention and such embodiment will be described, but it will be understood that various changes may be made from the construction disclosed, and that the drawings and description are not to be construed as defining or limiting the scope of the invention, the claims forming a part of this specification being relied upon for that purpose.

Of the drawings:

FIG. 1 is a fragmentary, front elevational view of the wheel dresser assembly of a grinding machine incorporating the present invention;

FIG. 2 is a side elevational view of the wheel dresser assembly shown in FIG. 1;

FIG. 3 is a fragmentary vertical view thereof, partially in section, taken substantially on line 3—3 of FIG. 2;

FIGS. *4a, b, c, d, e* and *f* are schematic plan views showing the various positions of the dressing tool during the wheel dressing sequence;

FIG. *5a* is a schematic front elevational view in partial section of the main dresser shaft shown in wheel dressing position;

FIG. *5b* is similar to FIG. *5a*, but with the main dresser shaft in an elevated position;

FIG. *5c* is a view similar to FIGS. *5a* and *5b* but showing the dresser shaft in its lowered and rotated position with respect to the grinding wheels;

FIG. 6 is an enlarged, fragmentary elevational view of the stop means of the wheel dresser positioning assembly shown in the full forward position of the dresser assembly;

FIG. 7 is a view similar to FIG. 6, but showing the position thereof when the dresser assembly is in its full retracted position;

FIG. 8 is a schematic perspective view of the dresser assembly of the present invention showing another form of holder for the dressing tool;

FIG. 9 is an enlarged schematic perspective view of the tool holder shown in FIG. 8;

FIG. 10 is a schematic plan view showing the position of the dresser tool of FIG. 9 when dressing the rear grinding wheel; and

FIG. 11 is a view similar to FIG. 10, but showing the dresser tool rotated to dress the forward grinding wheel.

The wheel dresser mechanism of the present invention

is one of a plurality of assemblies included in a centerless grinding machine of the general type disclosed and described in my Patent No. 3,080,686. It is contemplated, however, that the present invention will be used primarily with grinders having a plurality of grinding wheels rather than a single wheel as shown in the aforesaid patent. For purposes of illustration, I have shown and described a grinder having two side-by-side grinding wheels arranged to rotate on a common transverse axis extending perpendicular to the longitudinal, or left to right, dimension of the centerless grinding machine.

A dresser assembly **20** is supported within a dresser housing **22** to the left of and adjacent to a stationary grinding wheel assembly **24** as viewed in FIG. 1. A guard plate **26** partially covers the grinding wheel assembly and forms part of the dresser housing **22** which is supported on a base **28**. The base is slidably supported on a machine bed **29** for reciprocating sliding movement thereon from left to right as seen in FIG. 1 toward side-by-side, coaxial grinding wheels **30** and **31** to advance the dresser assembly as desired into wheel dressing position for selective engagement with the peripheral edge portions of the grinding wheels. The base **28** is moved by conventional drive means along a dovetail slide **32** on the bed **29**, the base **28** being formed with a complimentary dovetail slot **33**.

A wheel dresser positioning assembly **34** also supported by the base **28** and located to the rear of the dresser assembly is provided to move the dresser assembly horizontally from front to rear, or transversely, on the base **28** parallel to the axis of rotation of the wheels for selective positioning of the dresser assembly with respect to the peripheral edge portion of either wheel for dressing thereof. This dresser positioning assembly will be described more fully hereinafter, attention being directed now to some details of the dresser assembly per se.

The dresser assembly **20** has an independent, reversible drive motor **35** which is mounted on the rear of the housing **22**. A pulley and belt connection connects the motor to a pulley **36** keyed to the upper end of a vertical spline shaft **38** rotatably supported in the upper portion of the housing **22**. The depending or lower end portion of the spline **38** is adapted to be nonrotatably received in an aligned bore **40** in the upper end portion of a main dresser shaft **42** to permit reciprocable vertical sliding movement of the dresser shaft **42** on the spline shaft **38**. The main dresser shaft **42** is suitably supported at its upper and lower ends in a subframe **44** for rotative movement about a vertical axis coaxial with the spline shaft **38** and the bore **40**.

The subframe **44** is located to the left of the axis of rotation of the grinding wheels and is supported in the housing **22** for vertical movement therein within a vertically disposed, dovetail guideway **46** in the side of the housing **22**, the subframe **44** being formed with complimentary dovetail side portions **47, 47**. A vertically disposed reversible hydraulic cylinder **48** is supported on the housing above the subframe with a piston rod **50** extending vertically downwardly from the lower end of the cylinder with its end portion **52** suitably secured to the subframe as shown, permitting the subframe to be moved upwardly and downwardly within the guideway upon actuating the cylinder to retract and extend the rod, thereby causing the main dresser shaft to move vertically on the spline **38**. Vertical travel of the subframe within the guideway is limited by adjustable stops **54** and **55** mounted on the housing **22** above and below the subframe **44**, respectively, and arranged to engage alternately abutments **56** and **57** provided on the upper and lower surfaces, respectively, of the subframe.

A dressing tool holder **58** is carried by the main dresser

shaft 42 intermediate the upper and lower ends thereof and is arranged and constructed to hold a diamond-tip dressing tool 60 disposed substantially in the same horizontal plane as the axis of rotation of the side-by-side grinding wheels 30 and 31. An access opening 62 is provided in the frame 44, substantially opposite the tool holder 58 as shown, to provide access to the tool holder upon removal of the cover plate 64 to permit adjustment or replacement of the dressing tool when necessary.

The dresser housing 22 is constructed for horizontal reciprocation on the base 28 transversely, or from front to rear, parallel with the axis of rotation of the grinding wheels 30 and 31 along a dovetail slide 66 on the base, the housing 22 being formed with a complimentary dovetail slot 68. As the housing 22 reciprocates on the slide, the dressing tool 60 carried thereby moves from a dressing position opposite one of the side-by-side grinding wheels to a dressing position opposite the other of the two side-by-side grinding wheels. Movement of the dresser housing and assembly is accomplished by the dresser positioning assembly 34 carried by the base 28 rearwardly of the housing 22 as shown in FIG. 2.

The wheel dresser positioning assembly has an independently reversible motor 70 which is mounted on the rear end of the dresser housing 22 with its shaft extending horizontally as shown in FIG. 2. A pulley and belt connection 74 connects the motor to a transversely extending horizontal lead screw 76 rotatably supported on the rear end of the housing 22 below the motor 70. The forward end portion of the lead screw 76 is suitably secured to the housing 22 for rotative movement therein, and lineal movement therewith. The opposite end portion 78 of the lead screw is formed with threads 80 thereon and is threaded into a suitable support 82 secured to the base 28 rearwardly of the housing 22. When the reversible motor 70 is energized to rotate the lead screw 76 in a clockwise direction, as viewed from the front of the grinding machine, the lead screw travels rearwardly in a horizontal plane as its end portion 78 threads into the support 82 drawing the housing 22 therewith rearwardly on the slide 66. When the motor is reversed to rotate the lead screw counterclockwise, the housing 22 will be pushed or moved forwardly on the base 28.

To insure accurate transverse positioning of the housing 22 and dressing tool 60, carried therein, for dressing each of the transversely spaced grinding wheels 30 and 31, axially spaced, opposed annular clamps 84 and 85 are provided, keyed to the dresser lead screw 76 intermediate the ends thereof between the rear of the housing 22 and the support 82 for rotation with the lead screw. Adjustably positionable stops 86 and 87 secured to the periphery of the facing surfaces of the opposed clamps 84 and 85 respectively, provide abutment surfaces engageable with micrometer stops 88 and 89 adjustably positioned on the base 28 to cooperate with the stops 86 and 87, respectively, to limit the transverse travel of the housing 22 in either a forward or rearward direction. It is apparent that engagement of either of the stops 86 or 87 with its respective, cooperating micrometer stop 88 or 89 will stop the rotation of the lead screw and thereby stop further transverse movement of the housing 22. For example, when the dresser lead screw is rotated in a clockwise direction, drawing the housing 22 rearwardly, the stop 87 is rotated into engagement with the micrometer stop 89 as shown in FIG. 7, positioning the housing 22 and the dressing tool 60 carried therein, transversely on the base 28 for dressing the inner grinding wheel 31. Rotating the lead screw 76 in a counterclockwise direction will engage the stop 86 with the micrometer stop 88, as in FIG. 6, transversely positioning the housing 22 and the dressing tool 60 for dressing the outer grinding wheel 30. It is obvious that precise transverse adjustment of the dressing tool 60 can be obtained by the cooperative action of the stops 86 and 87 with the stops 88 and 89 to limit the transverse travel of the housing 22 permitting precision dressing of the grinding wheels 30 and 31.

The grinding wheels may be dressed whenever required and the dressing cycle or operation may be either automatic after working a predetermined number of parts or as required by the machine operator. The housing 22 supporting the dressing assembly is normally positioned on the base 28 in its forward position longitudinally aligned with the wheel 30 and with the main dresser shaft 42 in the rotated position assumed at the completion of the previous dressing cycle. Wheel dressing is begun by advancing the base 28 from left to right on the machine bed 29 toward the grinding wheels to position the dressing tool 60 supported in the housing 22 on the base 28 in dressing relation to the wheels 30 and 31 to permit selective engagement by the dressing tool with the peripheral edge portions of the grinding wheels from the left side of their common axis of rotation.

When the base 28 is fully advanced from left to right toward the grinding wheels to bring the dressing tool to the position shown in FIG. 4*f*, the cylinder 48 is actuated by suitable switch means, either automatic or manual, to retract the rod 50 to elevate the attached subframe 44 within the guideway 46 formed in the housing 22. As the frame 44 is elevated, it carries with it the dresser shaft 42 arranged to slide vertically on the spline shaft 38 to provide clearance between the tool 60 and the grinding wheels to permit the housing 22 and the dressing tool to be moved rearwardly. When the shaft reaches its elevated position shown in FIG. 5*b* with the stop 54 engaging the abutment 56, the reversible motor 70 is energized to rotate the lead screw 76 in a clockwise direction as viewed from the front of the machine to draw the housing 22 rearwardly. The annular clamp 85, traveling rearwardly with the lead screw, rotates the stop 87 into engagement with the preadjusted micrometer stop 89 to prevent further rearward movement of the housing 22 for precise positioning of the housing to align the dressing tool longitudinally for dressing the inner wheel 31.

The cylinder 48, actuated when the housing reaches its rearmost position, lowers the frame 44 against the lower stop 55 to lower the tool 60 into dressing relation with the rear grinding wheel as shown in FIG. 4*a*.

As the grinding wheeling rotates freely, the reversible motor 35, energized by suitable switch means, rotates the spline shaft 38 through the pulley and belt connection 36 to rotate the main dresser shaft to swing the tool 60 through a horizontal dressing arc of approximately 90° while the tool is engaged with the peripheral edge portion of the rotating wheel 31. When the dressing tool has been rotated clockwise from the position shown in FIG. 4*b* to that of FIG. 4*c*, the direction of rotation of the motor 35 is changed to return the tool counterclockwise through the same horizontal arc to its starting position completing the dressing of the inner wheel 31. Whereupon the cylinder 48 is actuated to elevate the frame 44 against the stop 54. The driving direction of the motor 70 is reversed to rotate the lead screw 76 counterclockwise as viewed from the front of the machine to return the housing 22 forwardly on the slide 66 moving the dressing tool into dressing alignment longitudinally with the forward grinding wheel 30. The stop 86, rotated into engagement with the preset micrometer stop 88 by the clamp 84, prevents further rotation of the lead screw and accurately limits the forward transverse movement of the housing 22 for precise positioning of the dressing tool with respect to the wheel 30.

The subframe is again lowered as previously described against the adjustable stop 55 bringing the tool 60 into dressing position to dress the rotating forward grinding wheel 30 in the same manner as described for the rear wheel 31 by being swung clockwise and returned counterclockwise through a horizontal arc while engaged with the edge portion of the wheel 30 coming to rest in the

position shown in FIG. 4*f*. It is apparent that the present invention therefore permits the dressing tool and holder to be carried into dressing position relative to either of the grinding wheels **30** and **31** in the same wheel dressing attitude and position assumed by the holder and tool upon completing the dressing of the adjacent grinding wheel, thus permitting a dressing cycle during which the dressing tool travels through similar dressing arcs in the same sequence for each grinding wheel without disturbing the left-to-right adjustment of the dressing assembly or housing relative to the axis of rotation of the wheels. The positioning assembly, dressing assembly and housing are returned to their normal position to the left of and spaced from the grinding wheels by returning the base **28** from right to left on the machine bed **29** by conventional means.

Where adjacent grinding wheels of multiple wheel centerless grinding machines are closely spaced, the wheel dressing operation is made difficult by insufficient clearance between the wheels to permit the dressing tool and tool holder access to dress the facing surfaces of the peripheral edge portions of each wheel.

FIGS. 8 through 11 of the drawings show a modified form of a rotatably supported dressing tool holder for use with the present invention which facilitates dressing closely spaced, adjacent wheels. A dressing tool holder assembly **90** including a horizontally disposed, substantially cylindrical chuck **92**, an actuating cylinder **94** and adjustable stops **96** and **97**, is supported in the main dresser shaft **42** intermediate the ends thereof as shown in FIG. 8. The chuck **92**, suitably journaled within the main dresser shaft for rotative movement about its horizontal axis, is arranged and constructed to support a coaxial tool holder **98**, nonrotatably secured in the forward end portion thereof with its free end extending forwardly toward the grinding wheels. A dressing tool **100** is affixed to the free end of the chuck and normally resides in substantially the same horizontal plane as the axis of rotation as the grinding wheels **30** and **31**.

As shown in FIGS. 9 through 11, the free end portion of the holder **98** is relieved to provide a reduced terminal portion **102** having a surface **104** lying substantially in a plane containing the longitudinal axis of the holder. The tool **100** is secured to the end of the holder adjacent to the surface **104** substantially forming a continuation thereof. It is apparent that in dressing either of two closely spaced, adjacent wheels, that by positioning the holder **98** with the relieved surface **104** disposed vertically as shown in FIGS. 10 and 11 and facing the adjacent wheel, the dressing tool is permitted a greater arcuate travel around the peripheral edge portion of the wheel being dressed as a result of the additional clearance provided by the relieved holder with respect to the adjacent wheel.

The dressing tool holder assembly **90** includes the vertically mounted cylinder **94** which has a downwardly extending reciprocable rod **106** provided with a depending rack **108** engageable with gear teeth **110** provided on the rear terminal portion of the chuck **92** so that the said chuck provides a pinion rotatable by the rack on a horizontal axis to rotate the chuck **92** to position the tool holder **98** in dressing position for selective dressing of each of the grinding wheels **30** and **31** with the relieved surface **104** of the holder vertically disposed and facing the wheel adjacent to the wheel being dressed.

A ring member **112** is keyed to the chuck rearwardly of the annularly spaced teeth for rotation therewith and is provided with a radially extending arm **114** which functions to alternately engage the spaced stops **96** and **97** positioned on opposite sides of the axis of rotation of the member **112** when the chuck is rotated by the rack **108**. The stops **96** and **97** control the rotation of the tool holder **98** to approximately 180° whereby the surface **104** will lie substantially in a vertical plane when dressing either of the wheels **30** and **31**.

The stops **96**, **96** are secured to the main dresser shaft **42** arranged in operative position by any suitable means.

When using the modified form of dressing tool holder shown in FIGS. 8–11, the dresser housing, dresser assembly and wheel dresser positioning assembly each function in the same manner and in the same sequence as previously described. However, as the housing **22** carrying the main dresser shaft moves transversely from front to rear in its elevated position, the cylinder **94** is actuated to extend the rod and depending rack to rotate the chuck **92** and the holder **98** clockwise as seen in FIG. 9 through an arc of 180° until the arm **114** on the ring **112** is rotated into engagement with the adjustable stop **96** whereby the relieved surface **104** of the holder faces the front wheel **30** as shown in FIG. 10 when the tool **100** is brought into dressing engagement with the rear wheel **31**.

Upon completing the dressing cycle for the rear wheel the tool holder is again rotated as the main dresser shaft is being moved forwardly in its elevated position, toward the front wheel **30**. The rod and rack are retracted by the cylinder **94** to rotate the chuck **92** in a counterclockwise 180° arc to engage the arm **114** against the rear stop **97** to position the holder **98** with the relieved surface **104** facing the rear grinding wheel **31** as shown in FIG. 11 for dressing the forward grinding wheel **30**.

The modified form of dressing tool holder, like the form shown in FIGS. 1–7, likewise permits the dressing tool and holder to be carried into dressing position relative to either wheel in the same wheel dressing attitude assumed upon completing the dressing of the adjacent wheel, but not in the same position, however, as distinguished from attitude, since the holder is rotated as described to position the relieved surface **104** facing the wheel to be dressed.

While it is not essential for the purposes of the present invention that the housing **22** be moved rearwardly, as described, after advancing the base **28** from left to right, to bring the dressing tool in position to dress the rear grinding wheel at the start of the dressing cycle, it has been found in practice to be more efficient to do so. The transverse movement of the housing subsequent to the left to right movement of the base **28** eliminates inaccuracies caused by "slip-stick," or inertial movement of the base **28** and permits uniform dressing of both wheels to the same diameter and contour.

The invention claimed is:

1. In a grinding machine of the type having a base, at least two relatively closely spaced, coaxially supported grinding wheels that are to be dressed for non-rectilinear grinding, a wheel dressing assembly on the base supported for selective horizontal reciprocation parallel with and transverse to the axis of wheel rotation, a dressing tool holder carried by the assembly for vertical reciprocation relative to the base, means for effecting horizontal reciprocation of the assembly for selectively positioning the dressing tool relative to the peripheral edge portions of the grinding wheels, and means for effecting vertical reciprocation of the tool holder, whereby the said holder can be moved from one grinding wheel to another without change in attitude selectively to dress the peripheral edge portions of the wheels.

2. In a grinding machine of the type having a base and relatively closely spaced coaxial grinding wheels that are to be dressed for non-rectilinear grinding, a housing, a wheel dressing assembly supported by the housing for horizontal reciprocation on the base parallel with the axis of wheel rotation, a dressing tool holder carried by the assembly and arranged for arcuate reciprocation and vertical reciprocation on a common vertical axis, means for effecting horizontal reciprocation of the assembly to permit selective positioning of the dressing tool holder in dressing position relative to each grinding wheel, means for effecting arcuate reciprocation of the dressing tool holder for dressing the peripheral edge portions of the

wheels, and means to effect vertical reciprocation of the holder whereby the holder may be moved from one grinding wheel to another without change in attitude.

3. In a grinding machine of the type having a base and relatively closely spaced coaxial grinding wheels that are to be dressed for non-rectilinear grinding, a housing, a wheel dressing assembly supported by the housing for horizontal reciprocation on the base parallel with the axis of wheel rotation, a driven shaft rotatably secured to the housing and depending vertically therefrom for operative association with the dressing assembly, a dressing tool holder carried by the assembly for arcuate movement about the axis of rotation of the driven shaft to dress the grinding wheels and for vertical reciprocation on the shaft relative to the base, driving means to rotate the driven shaft, means for effecting vertical reciprocation of the tool holder, and means for effecting horizontal reciprocation of the assembly whereby the said holder may be moved from one grinding wheel to another without change in attitude.

4. The improvement according to claim 3 wherein the tool holder is carried by a dresser shaft rotatably supported within the dresser assembly and operatively associated with the driven shaft for rotation therewith and vertical reciprocation thereon.

5. The improvement according to claim 4 wherein the dresser shaft is formed with a vertical bore therein coaxial with and arranged to receive the driven shaft for rotative movement therewith and reciprocating axial sliding movement thereon to permit the dressing tool holder and dresser shaft to be reciprocated vertically on the driven shaft and rotated thereabout.

6. In a grinding machine of the type having a base, at least two relatively closely spaced coaxially supported grinding wheels that are to be dressed for non-rectilinear grinding, a wheel dressing assembly supported on the base for horizontal reciprocation parallel with the axis of wheel rotation, a substantially horizontally disposed dressing tool carried by the assembly for rotation about its horizontal axis and vertical reciprocation relative to the base, means for effecting horizontal reciprocation of the assembly for selectively positioning the dressing tool relative to the edge portions of the grinding wheels, means carried by the assembly and operatively associated with the dressing tool for effecting horizontal rotation of the tool about its said axis into dressing position, and means for effecting vertical reciprocation of the tool whereby the tool can be moved from one grinding wheel to another without change in attitude selectively to dress the peripheral edge portions of the wheels.

7. The improvement according to claim 6 including a tool holder supporting the said dressing tool, said holder and dressing tool having a common horizontal axis and secured within a rotatable chuck arranged within the assembly for rotative movement about said horizontal axis and in which the means effecting rotation of the tool include a driven rack engageable with a plurality of annularly arranged gear teeth associated with the chuck defining a pinion thereon, and driving means supported in the housing to reciprocate the rack.

8. The improvement according to claim 7 including adjustable stop means carried by the assembly and engageable with the chuck to limit the rotative movement thereof to permit the dressing tool to engage each grinding whel in a predetermined rotated position.

9. The improvement according to claim 7 wherein the dressing tool holder is provided with means defining a relieved portion adjacent to the dressing tool to permit the holder to be rotated into dressing position for each wheel wherein the relieved portion faces the adjacent wheel.

10. In a grinding machine of the type having a base, at least two relatively closely spaced coaxial grinding wheels that are to be dressed for non-rectilinear grinding; a housing, a wheel dressing assembly supported by the housing for horizontal reciprocation on the base parallel with the axis of wheel rotation; a dressing tool holder carried by the assembly and arranged for arcuate reciprocation and vertical reciprocation on a common vertical axis; means for effecting horizontal reciprocation of the assembly including a driven lead screw rotatably secured at one end to the housing and extending horizontally therefrom, a support adapted to receive the extending lead screw for rotation therin, drive means associated with the lead screw, and adjustable stop means associated with the lead screw and operative to limit the rotation thereof to permit selective positioning of the dressing tool holder in dressing position relative to each grinding wheel to permit accurate dressing thereof; means for effecting arcuate reciprocation of the dressing tool holder about said vertical axis for dressing the peripheral edge portions of the wheels; and means to effect vertical reciprocation of the holder whereby the holder may be moved from one grinding wheel to another without change in attitude.

11. The improvement according to claim 10 wherein the adjustable stop means includes spaced stops arranged on the lead screw for movement therewith and selective engagement with spaced stops supported on the base.

References Cited by the Examiner

UNITED STATES PATENTS

1,219,841	3/1917	Moor	125—11.7
2,298,496	10/1942	Metzger	125—11.16
2,314,483	3/1943	DeVlieg	125—11.7
2,665,681	1/1954	Hass et al.	125—11.7
3,080,686	3/1963	Healy et al.	126—11.6

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