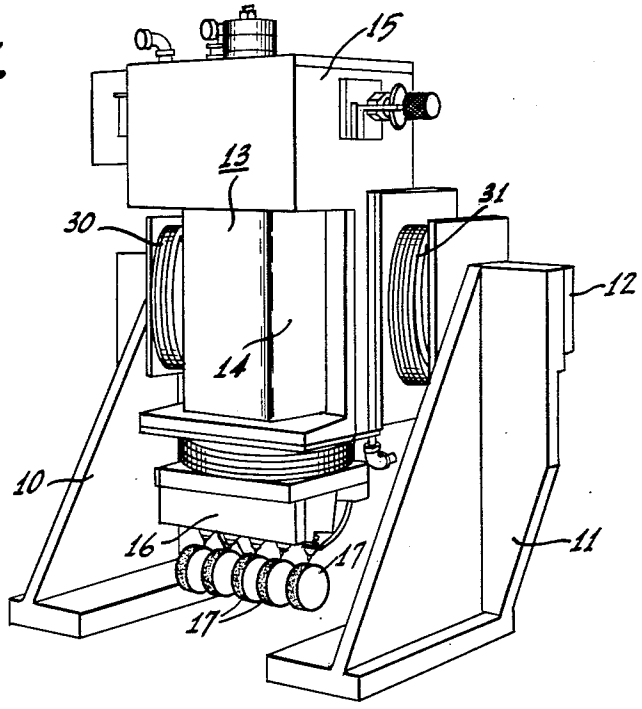
Oct. 6, 1964 N. HOGLUND 3,151,606

GRINDING WHEEL DRESSING APPARATUS

Filed Dec. 4, 1961 4 Sheets-Sheet 1

Fig. 1.



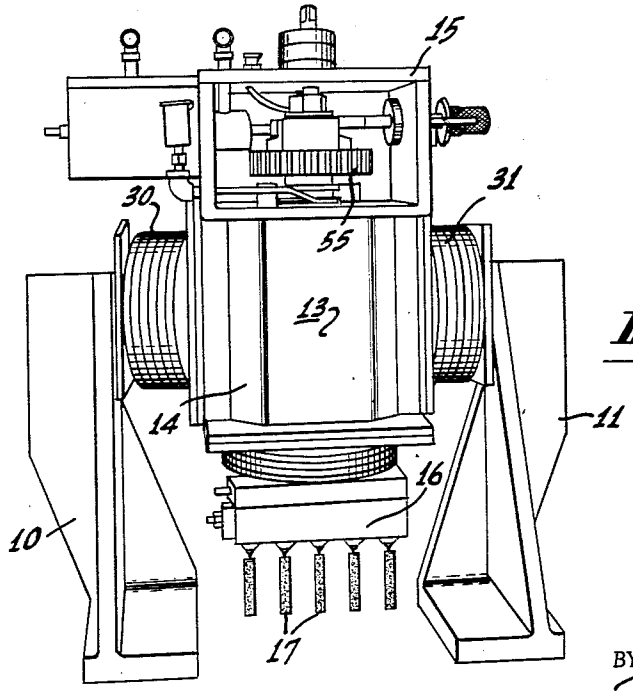


Fig. 2.

INVENTOR.
NILS HOGLUND
BY
William A. Galesak
ATTORNEY

Oct. 6, 1964 N. HOGLUND 3,151,606

GRINDING WHEEL DRESSING APPARATUS

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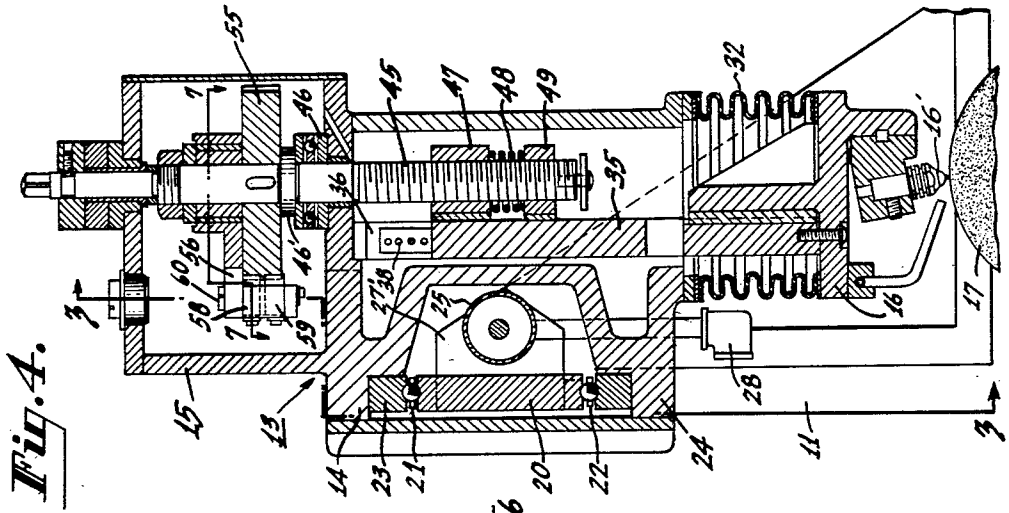


Fig. 4.

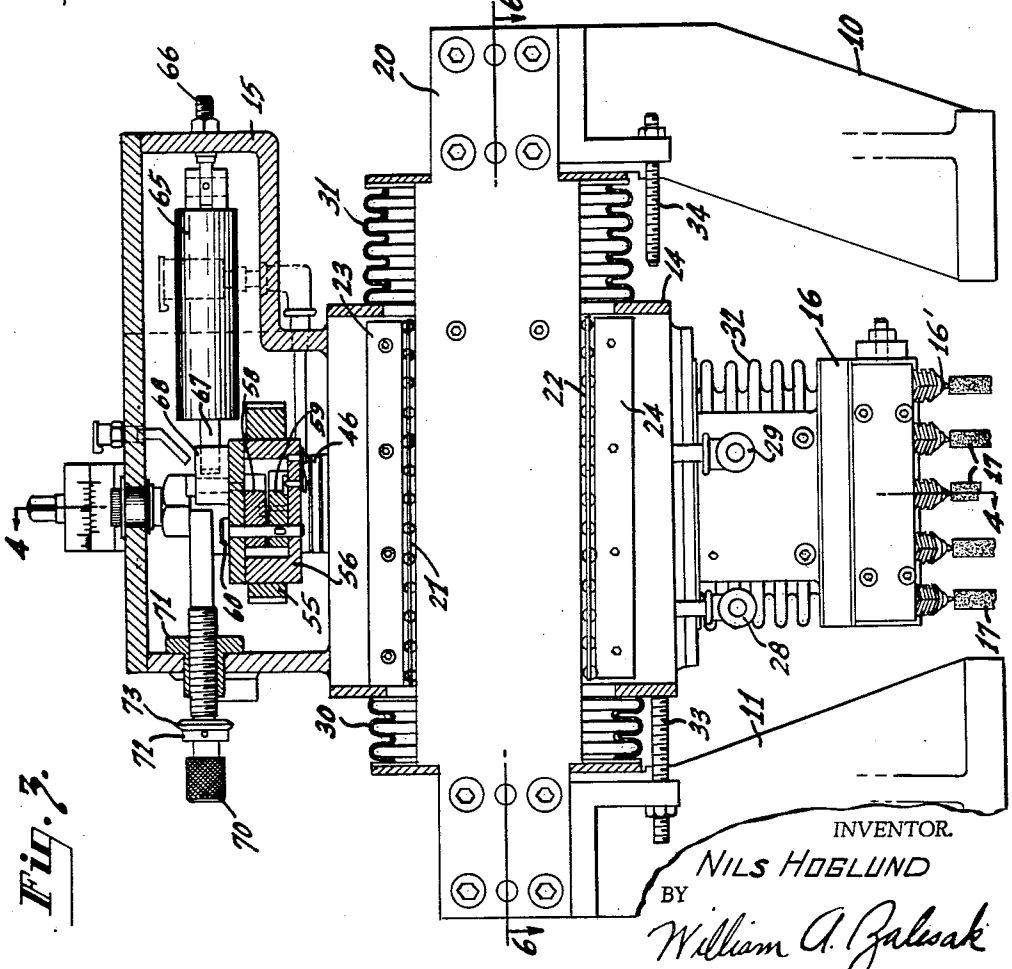


Fig. 3.

INVENTOR.
NILS HOGLUND
BY
William A. Galasak
ATTORNEY

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GRINDING WHEEL DRESSING APPARATUS

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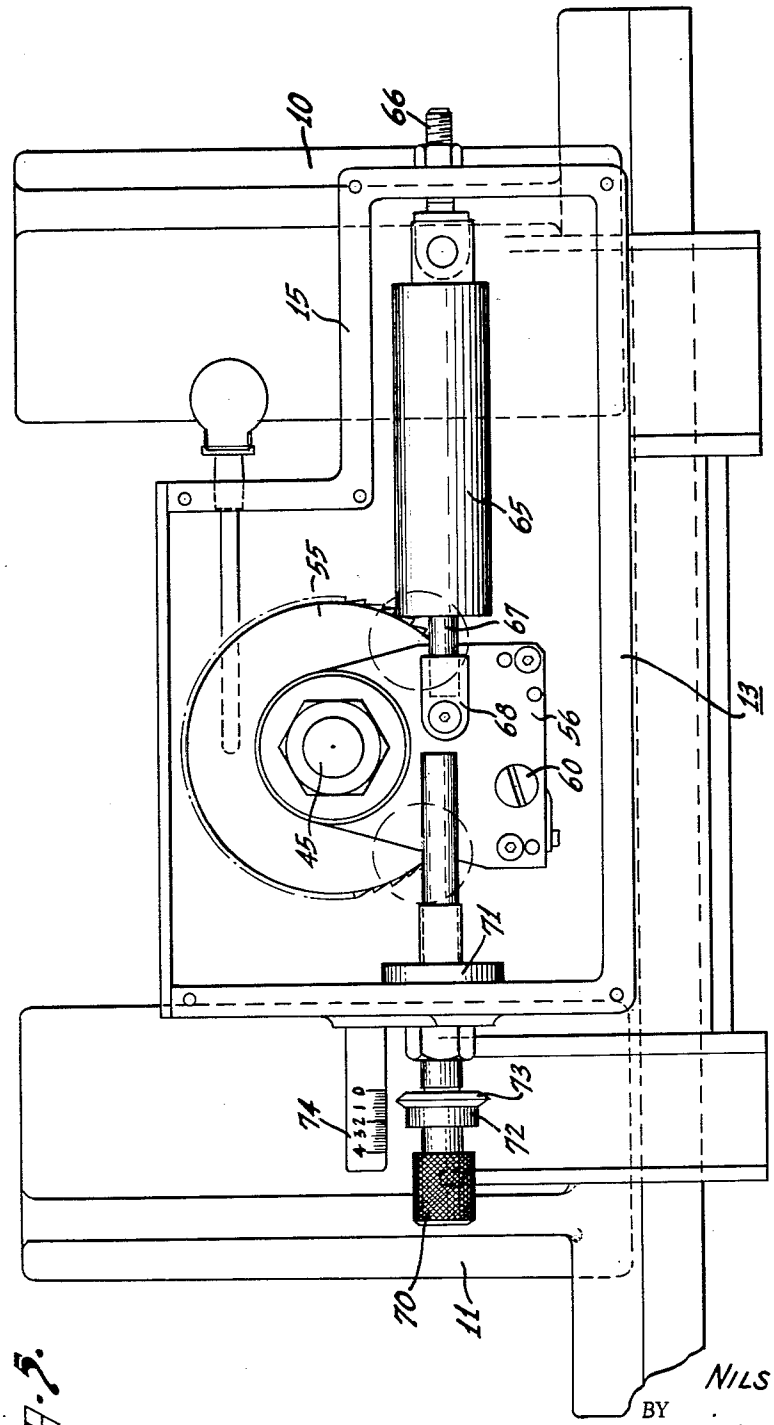


Fig. 5.

INVENTOR.
NILS HOGLUND
BY
William A. Zalenak
ATTORNEY

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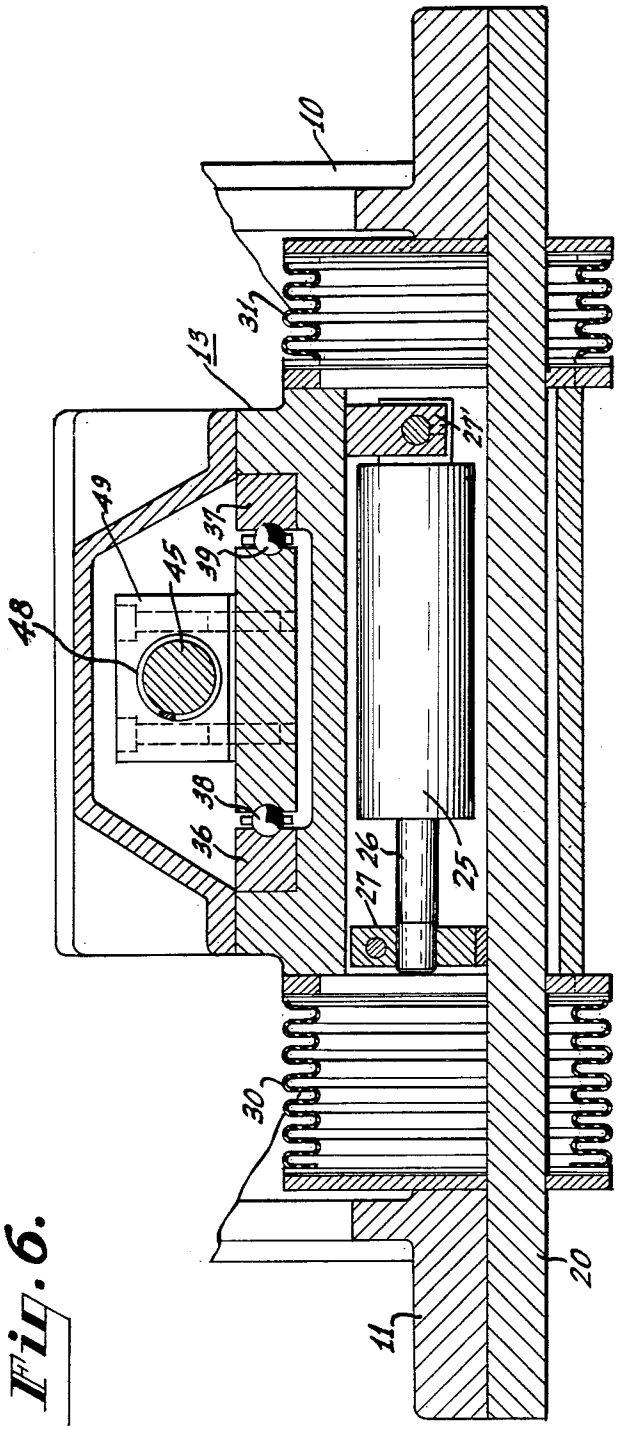


Fig. 6.

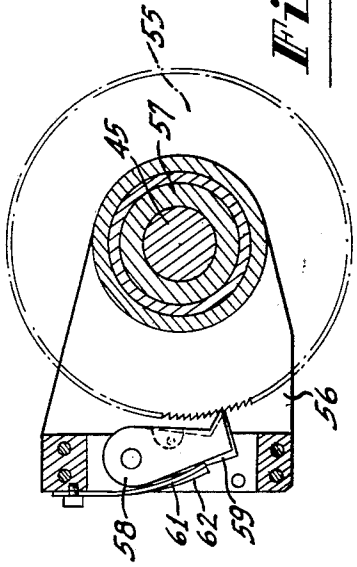


Fig. 7.

INVENTOR.
NILS HOGLUND
BY
William A. Galesak
ATTORNEY

United States Patent Office 3,151,606 Patented Oct. 6, 1964

3,151,606

GRINDING WHEEL DRESSING APPARATUS

Nils Hoglund, 296 Hartshorn Drive, Short Hills, N.J.

Filed Dec. 4, 1961, Ser. No. 156,756
6 Claims. (Cl. 125—11)

My invention relates to a grinding wheel dressing apparatus and more particularly to a grinding wheel dressing apparatus for peripheral straight dressing a plurality of grinding wheels.

Satisfactory dressing apparatus of the kind described requires rigidity for accurate dressing and continuous operation. To insure continuous and accurate dressing, all moving parts must be carefully shielded and completely enclosed against dust. However, the shielding elements must not interfere with easy and accurate movement of the moving parts. Accuracy and fine control of the infeed operation of the dressing tool is also a requirement.

It is therefore an object of my invention to provide a wheel dressing apparatus of improved design which is capable of simultaneously dressing a plurality of grinding wheels.

It is a more specific object of my invention to provide such an apparatus which is capable of very accurate and continuous operations.

A further object of my invention is to provide such an apparatus in which the moving parts are completely protected against dust and dirt thus reducing wear and maintaining accuracy while at the same time permitting easy movement of the moving parts.

A still further object of my invention is to provide an apparatus of the kind described in which fine control of the infeed operation is obtained.

Briefly, apparatus made according to my invention includes a rigid support adapted to be secured to a grinding wheel apparatus, and which supports a stationary slide. A movable housing is slidably supported on the slide for reciprocal movement. The housing in turn supports a tool slide movable transversely of the path of movement of the housing. Infeed mechanism, including a feed screw, is attached between the housing and the tool slide. The feed control mounted within the housing includes a ratchet wheel attached to the feed screw and a pair of pawls associated with the feed screw which is operated by means of a hydraulic mechanism.

In the drawings:

FIG. 1 is a front view in perspective of a grinding wheel dressing apparatus made according to my invention;

FIG. 2 is a front perspective from a different angle of apparatus made according to my invention and with the ratchet cover removed to show details of construction;

FIG. 3 is a vertical section taken along the line 3—3 of FIG. 4;

FIG. 4 is a vertical section taken along the line 4—4 of FIG. 3;

FIG. 5 is a top or a plan view of FIG. 3 (slightly enlarged) with the ratchet housing cover removed;

FIG. 6 is a transverse section (slightly enlarged) taken along line 6—6 of FIG. 3; and

FIG. 7 is a transverse section of the ratchet mechanism taken along line 7—7 of FIG. 4.

Referring particularly to FIGS. 1 and 2, apparatus employing my invention comprises a frame including support members **10** and **11** having a fixed slide assembly **12** attached at its end to the support members **10** and **11**. Support members **10** and **11** may be fixed to the grinding wheel assembly. The main or sliding housing **13** providing upper and lower compartments includes a lower portion or compartment **14** which carries housing guides and a feed screw to be described and an upper portion or compartment **15** for enclosing a ratchet housing which supports the infeed screw and ratchet mechanism for infeeding the tool slide all of which mechanism will be described below.

The tool slide which is mounted for vertical movement within the housing portion or compartment **14** supports the tool holder or diamond block or tool assembly **16** carrying tools **16'** at its lower end for dressing the grinding wheels **17**.

Briefly, the housing **13** is moved back and forth along a path parallel to the axis of rotation of the wheels being dressed by means of a hydraulic mechanism. The infeed slide which supports the diamond dressing tools is fed radially toward the axis of rotation of the grinding wheels by means of the ratchet mechanism connected to the ratchet wheel mounted on a screw which feeds the tool vertically by small controlled increments. A novel adjusting screw determines the amount of each increment of radial movement of the tool.

Referring particularly to FIGS. 3, 4, and 6, the housing **13** is slidably supported on fixed slide **20** mounted on the bracket supports **10** and **11**. The housing **13** is slidably mounted by means of ball bearing assembly **21** and **22** and guides **23** and **24** to move back and forth parallel to the axis of rotation of the wheels being dressed. The housing and associated mechanism are moved back and forth by means of the hydraulic cylinder **25** having a piston rod **26** fixed to the bracket **27**. The bracket **27** is fixed to the tool slide **20** and bracket **27'** is fixed to the housing **13**. Fluid under pressure is fed to the cylinder **25** by means of the couplings **28** and **29** from a fluid pressure source not shown. Boots **30** and **31** protect slide **20** and bearings **21** and **22** from dust and dirt. Boot **32** protects slide **35** and bearings **38** and **39**. Adjustable stops **33** and **34** limit movement of housing **13**.

The tool slide assembly which is mounted to slide vertically includes vertically movable slide **35** slidably supported in guides **36** and **37** by means of the ball bearing assemblies **38** and **39**.

An infeed mechanism for feeding the tool holder toward the axis of the grinding wheels to be dressed includes a few screw **45** mounted on housing portion **14** by means of thrust bearing **46** abutting shoulder **46'** of the feed screw **45**. Feed screw **45** is attached to slide **35** by means of the fixed nut **47**. The fixed nut is preloaded by spring **48** and free nut **49**.

Fixed to the feed screw **45** above the shoulder **46'** is a ratchet wheel **55**. Co-operating with ratchet wheel **55** for causing feeding of the tool slide **35** is a double pall mechanism mounted in the ratchet housing **56** (FIGS. 3, 4, 5 and 7). Ratchet housing **56** is pivotally mounted on feed screw **45** by means of bushing **57**. Pivotally mounted by means of pin **60** in housing portion **15** are a pair of pawls **58**, **59**. These pawls are designed to be a half tooth apart with respect to ratchet wheel **55**. Leaf springs **61** and **62** bias the pawls into engagement with the ratchet wheel **55**. The housing **56** and pawls **58** and **59** are reciprocated by means of hydraulic cylinder **65** attached to the housing portion **15** by eye member **66**. The piston rod **67** is connected to ratchet housing **56** by connector **68**.

Thus, as the hydraulic cylinder is subjected to fluid under pressure and is caused to move back and forth the pawls when rotated counterclockwise cause the ratchet wheel to rotate screw **45** to cause the nut fixed to the tool slide to move downwardly to cause the diamond tools on block **16** to move radially to the axis of rotation of the wheels being dressed.

In order to permit adjustment of the rate of feed of the tool and tool slide relative to the work pieces, that is, the wheels being dressed, I provide mechanism for rotating the screw by small increments. This mechanism limits the motion of the piston rod **67** and by this means limits the number of teeth picked up by the pawls **58** and **59**

acting on the ratchet wheel 55. By this means, half a tooth can be fed at a time when the space between two pawls equals half a tooth.

This mechanism includes a feed adjustment screw consisting of stop screw 70, engaging nut 71 having a rotating wheel 72 and a wheel 73 which indicates on scale 74 the amount of infeed of the motion of the piston and ratchet housing.

The design of the housing promotes easy assembly and repair and offers optimum protection of the moving parts from dust and dirt thereby promoting the life of the apparatus.

What is claimed is:

1. Apparatus for simultaneously dressing a plurality of grinding wheels comprising a support including a pair of spaced supporting members, a slide extending transversely of and secured to said supporting members, a housing slidably mounted on said slide and adapted to move parallel to the axis of rotation of the wheels being dressed, said housing comprising a plurality of compartments, mechanism in one of said compartments connected between said housing and said slide for causing movement of said housing along said slide, a feed screw mounted on said housing, a slidable tool assembly mounted on said housing and connected to said feed screw, a ratchet wheel in another compartment connected to said feed screw, a pair of adjacent pawls engaging said ratchet wheel, and means connected between said housing and said pawls for moving said pawls to rotate said ratchet wheel and said screw whereby said tool assembly is moved radially of the grinding wheels being dressed.

2. Apparatus for simultaneously dressing a plurality of grinding wheels comprising a support including a pair of spaced supporting members, a slide extending transversely of and secured to said supporting members, a housing slidably mounted on said slide and adapted to move parallel to the axis of rotation of the wheels being dressed, said housing comprising a plurality of adjacent compartments, fluid operated mechanism mounted in one of said compartments and connected between said housing and said slide for causing movement of said housing along said slide, a feed screw rotatably mounted on said housing and extending into the other compartment, tool slide on said housing, a tool assembly mounted on said tool slide, a ratchet wheel connected to said feed screw and enclosed within said other compartment, a pawl housing rotatably mounted on said feed screw and including a pair of adjacent pawls engaging said ratchet wheel, fluid operated means connected between said housing and said pawls for moving said pawls to rotate said ratchet wheel and said screw whereby said tool slide and tool assembly is moved radially of said grinding wheels being dressed, and means on said housing for controlling the length of the path of movement of said pawls.

3. Apparatus for simultaneously dressing a plurality of grinding wheels comprising a support including a pair of spaced supporting members, a slide extending transversely of and secured to said supporting members, a housing slidably mounted on said slide and adapted to move parallel to the axis of rotation of the wheels being dressed, mechanism within said housing connected between said housing and said slide for causing movement of said housing along said slide, a feed screw mounted on said housing, a slidable tool assembly connected to said feed screw, said slidable tool assembly including a tool slide having a plurality of spaced dressing tools fixed to one end thereof, a ratchet wheel connected to said feed screw, a pair of adjacent pawls rotatably mounted on said feed screw and engaging said ratchet wheel, means connected between said housing and said pawls for moving said pawls to rotate said ratchet wheel and said screw whereby said tool assembly is moved radially of said grinding wheels being dressed, and means for finely adjusting the degree of movement of said pawls comprising a screw member fixed to said housing and providing a stop member to limit movement of said pawls, means for adjusting said last screw member, and other means for indicating the degree of adjustment of said last screw, and flexible corrugated shields surrounding said first slide and connected between said spaced supporting members and a slidable housing and a flexible corrugated shield surrounding and connected to the tool end of said last slide and the slidable housing.

4. Apparatus for dressing of grinding wheels comprising a support including a pair of spaced supporting members, a slide extending transversely of and secured to said supporting members, a housing slidably mounted on said slide and adapted to move parallel to the axis of rotation of wheels being dressed, said housing including a plurality of adjacent compartments, mechanism within said housing connected between said housing and said slide for causing movement of said housing along said slide, said slide extending through one of said compartments a tool slide mounted in a second compartment and movable transversely of the movement of said housing on said tool slide, a feed screw rotatably mounted on said housing and extending between said second and a third compartment and connected to said tool slide in said second compartment, a pawl mechanism rotatably mounted on said feed screw and engaging said ratchet wheel, and means connected between said housing and said pawl mechanism for rotating said ratchet wheel and said screw whereby said tool slide and tool assembly is moved radially of wheel being dressed, and flexible shield members connected to said housing and enclosing portions of said secured slide and said tool slide for protecting moving parts from dust and dirt.

5. Apparatus for simultaneously dressing a plurality of grinding wheels comprising a support including a pair of spaced supporting members, a first slide extending transversely of and secured to said supporting members, a housing slidably mounted on said slide and adapted to move parallel to the axis of rotation of the wheels being dressed, said housing including a plurality of enclosed compartments, fluid operated mechanism within one of said compartments and connected between said housing and said slide for causing movement of said housing along said slide, a feed screw mounted on said housing, a slide in another of said compartments in said housing, a tool assembly mounted on said last slide, said last slide being connected to said feed screw, a ratchet wheel in still another of said compartments and connected to said feed screw, pawl mechanism engaging said ratchet wheel, means connected between said housing and said pawl mechanism for moving said pawl mechanism to rotate said ratchet wheel and said screw whereby said slide and tool assembly is moved radially of said grinding wheels being dressed, said tool assembly comprising a plurality of dressing tools fixedly mounted on said last slide and means for finely adjusting movement of said pawl mechanism comprising a screw member fixed to said housing and adapted to limit movement of said pawl mechanism, and other means for indicating the degree of adjustment of movement.

6. Apparatus for simultaneously dressing a plurality of grinding wheels comprising a support including a pair of spaced supporting members, a first slide extending transversely of and secured to said supporting members, a housing slidably mounted on said slide and adapted to move parallel to the axis of rotation of the wheels being dressed, said housing including a plurality of enclosed compartments, fluid operated mechanism within one of said compartments and connected between said housing and said slide for causing movement of said housing along said slide, a feed screw mounted on said housing, a slide in another of said compartments in said housing, a tool assembly mounted on said last slide, said last slide being connected to said feed screw, a ratchet wheel in still another of said compartments and connected to said feed screw, pawl mechanism engaging said ratchet wheel, means connected between said housing and said pawl mechanism for moving said pawl mechanism to rotate

said ratchet wheel and said screw whereby said slide and tool assembly is moved radially of said grinding wheels being dressed, said tool assembly comprising a plurality of dressing tools fixedly mounted on said last slide and means for finely adjusting movement of said pawl mechanism comprising a screw member fixed to said housing and adapted to limit movement of said pawl mechanism, and other means for indicating the degree of adjustment of movement, flexible corrugated shields surrounding said first slide and connected between said spaced supporting members and the slidable housing, and supporting flexible corrugated shield surrounding and connected to the tool end of said second slide and the slidable housing.

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