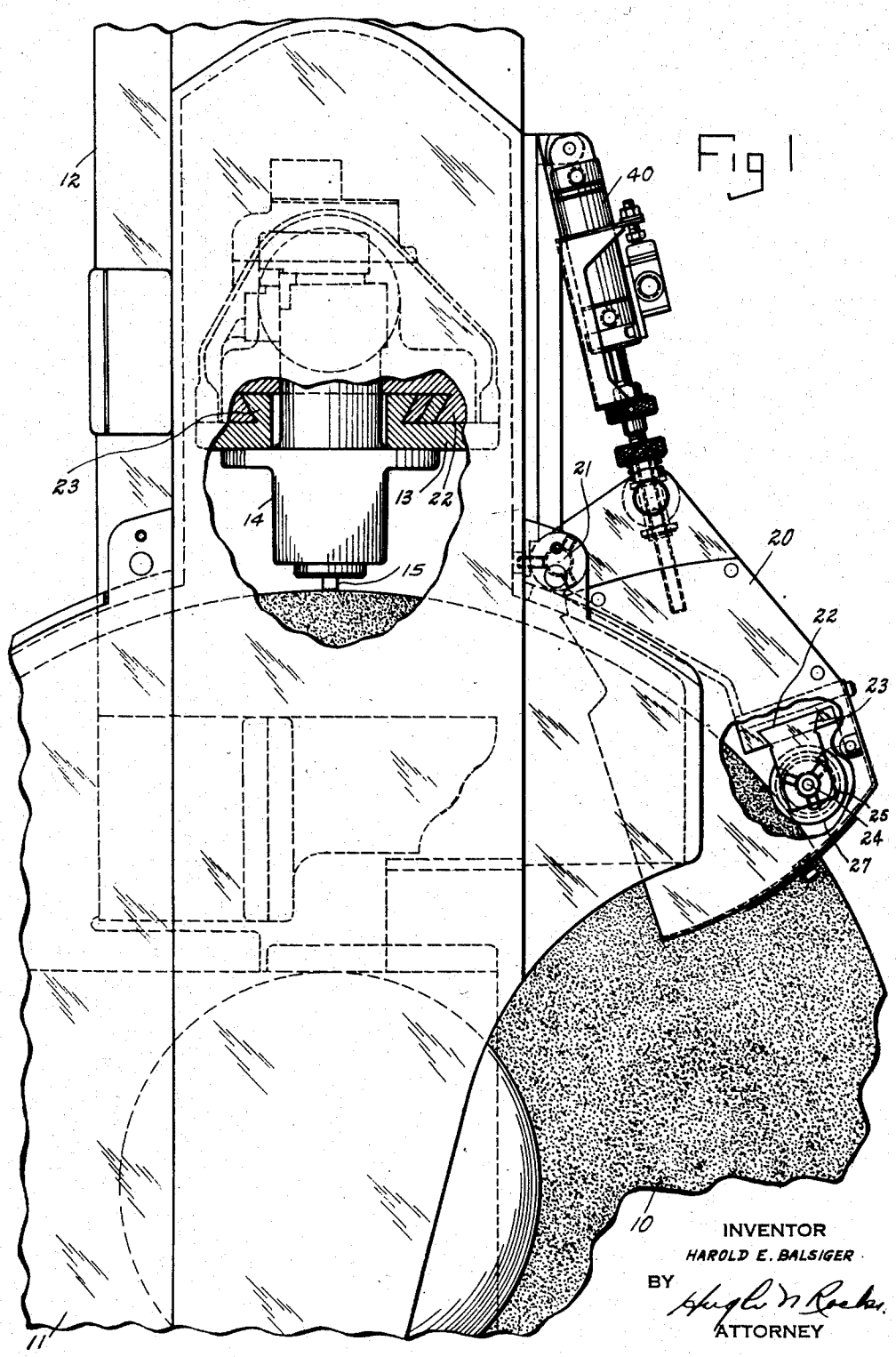
March 1, 1960 H. E. BALSIGER 2,926,651

ABRASIVE WHEEL FORMING AND DRESSING APPARATUS

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Fig 1



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ABRASIVE WHEEL FORMING AND DRESSING APPARATUS

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Fig 2

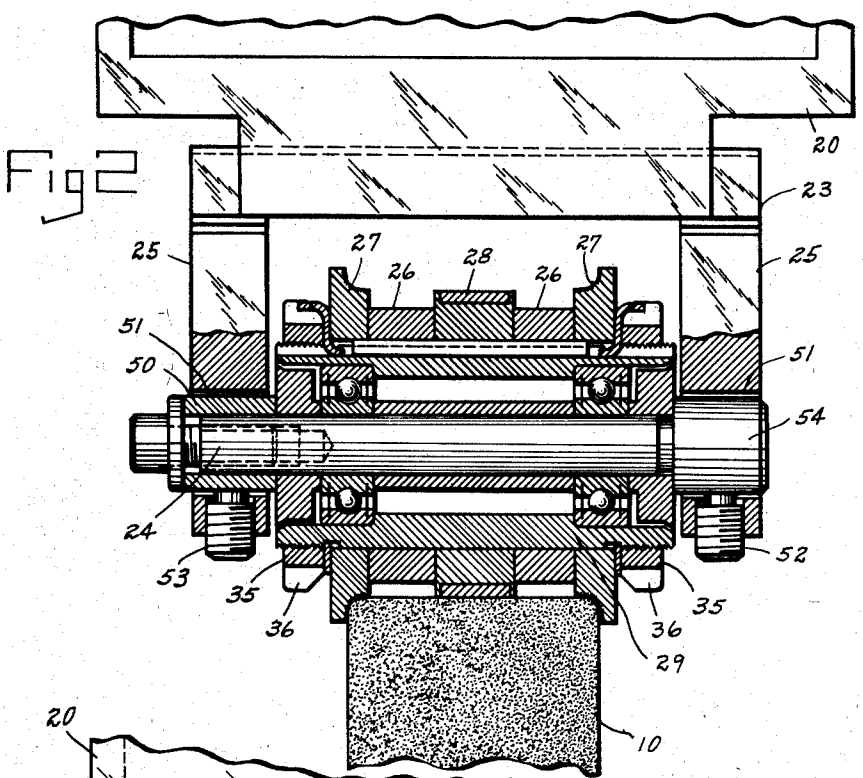
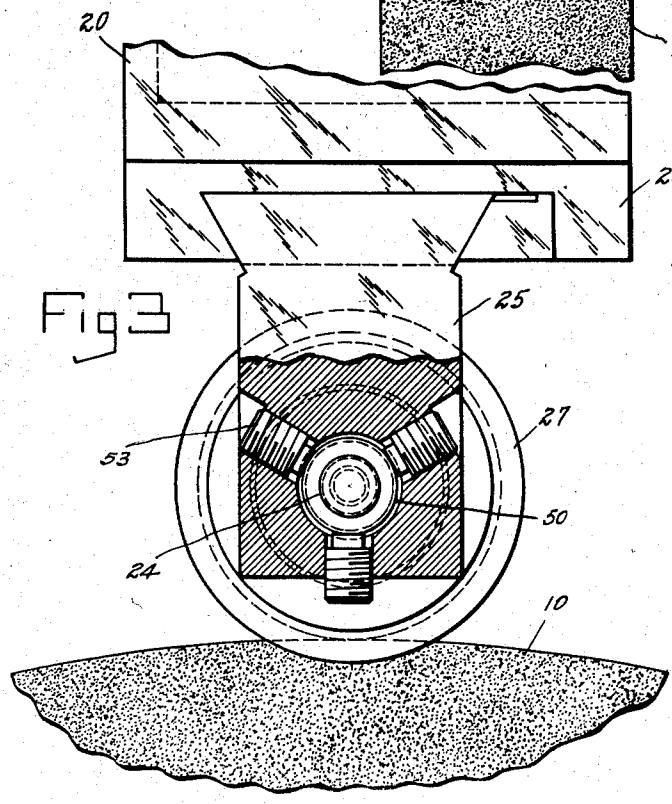


Fig 3



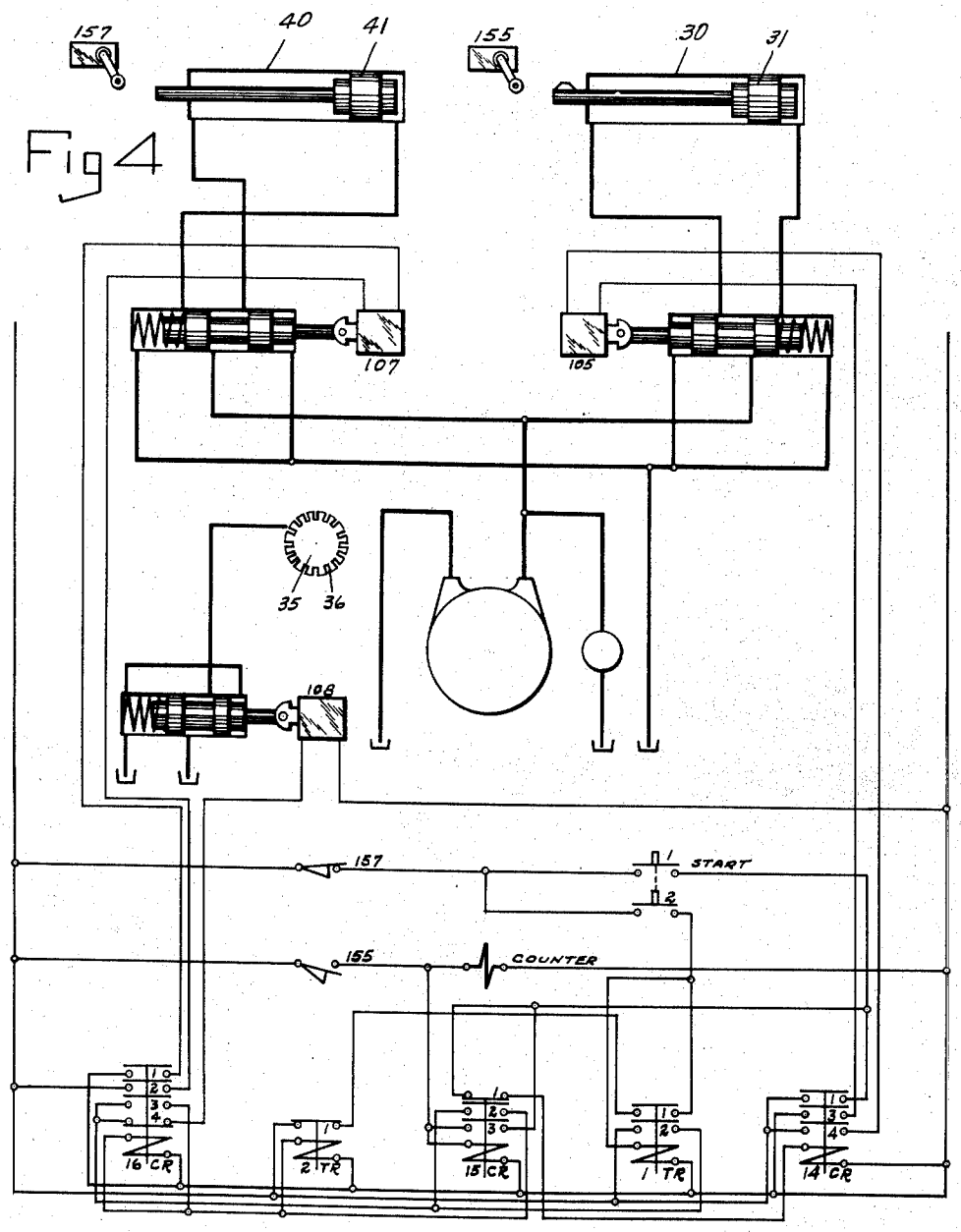
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ABRASIVE WHEEL FORMING AND DRESSING APPARATUS

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Fig 4



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ABRASIVE WHEEL FORMING AND DRESSING APPARATUS

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Application September 20, 1957, Serial No. 685,295

9 Claims. (Cl. 125—11)

This invention relates to dressing apparatus for abrasive wheels, particularly wheels requiring rounded corners.

Co-pending application Serial No. 653,418, filed April 17, 1957, discloses apparatus for dressing the corners of the grinding wheel.

It is therefore an object of this invention to provide means for dressing the corners of a grinding wheel, the face of the grinding wheel, and means for actuating the dressing devices in predetermined timed relation.

Another object is to provide means for effecting radial adjustment of the corner dressing means.

Another object is to provide a novel method of dressing a grinding wheel.

Figure 1 is an end elevation partly cut away to show the relation between the corner dressing roller and the grinding wheel between the face dressing tool of the grinding wheel.

Figure 2 is a partial sectional front elevation of the device for dressing the corners of the grinding wheel.

Figure 3 is an end elevation to show means for effecting radial adjustment and of the corner dresser.

Figure 4 is a hydraulic and electric diagram.

Numeral 10 indicates a rotatable grinding wheel. 11 is a fender and 12 is a column for carrying the dressing devices. Within the column 12 is a member 13 slidably mounted for movement parallel to the axis of the grinding wheel 10. A diamond holder 14 is suitably attached to member 13. A diamond dressing tool 15 is mounted in diamond holder 14. Conventional means (not shown) are provided for adjusting the diamond in a direction radially of the grinding wheel axis. Means for traversing the diamond dressing tool 15 consists of a piston 31 in cylinder 30.

At the front of column 12, a bracket 20 is pivotally mounted at 21. The lower part of bracket 20 has a dove tail slide 22 in which is slidably mounted a member 23. A shaft 24 mounted in depending portions 25 of member 23 has rotatably mounted thereon a dressing roller 26 consisting of two corner dressing members 27 formed to dress a radius on the corners of grinding wheel 10 and an intermediate member 28 for engaging the grinding wheel 10 and limiting the movement of the corner dressing members 27 relative to the corners of grinding wheel 10. Said roller 26 is held on sleeve 29 by means of nuts 35 having notches 36 which serve to accommodate a wrench and also to act as impellers when a jet of air is directed against them for initiating the rotation of said roller.

Shaft 24, on which said roller is mounted, has a head 54 at one end. The other end of said shaft 24 is supported in sleeve 50. Said sleeve 50 and head 54 are supported for radial adjustment in a cylindrical bore 51 in each of said depending portions 25. Said bore 51 is larger than sleeve 50, head 54, and shaft 24 so that the sleeve may be adjusted radially by means of adjusting screws 52 and 53 of which there are three for each end of shaft 24.

The function of the roller 26 might be performed

equally well by oscillating segments and reciprocating blocks. Such elements are mechanical equivalents of said roller. Wherever the term roller is used in the claims, these equivalent elements are included.

The composition of said roller may be varied to include diamond or carbide impregnated surfaces. When this type of roller is used, the roller and the grinding wheel rotate at different peripheral speeds in order to effect the dressing operation. The roller may also be made of smooth or rough carbides or equivalent materials. When a smooth carbide roller is used, the roller and the grinding wheel rotate at the same peripheral speed and the dressing operation is performed by a crushing action.

Operation

When the wheelbase (not shown) is in the back position, limit switch LS157 is closed. The purpose of this switch is to prevent operation of the dressing mechanism when the wheelbase is in the forward position.

LS157 connects the dressing circuit with a source of current to start the dressing operation.

The start switch is closed. This switch has two contacts.

Contact 1 of the start switch completes a circuit through normally closed 15CR1 to energize 14CR.

14CR3 and 14CR4 close to energize valve solenoid 105 to direct fluid under pressure to the head end of diamond traverse cylinder 30 to move piston 31 to the left to make the first pass of dressing tool 15 across the face of the grinding wheel 10. 14CR1 by-passes contact 1 of the start switch through normally closed 15CR1 to hold 14CR.

Contact 2 of the start switch completes a circuit to energize 1TR. 1TR1 completes a circuit from normally closed 2TR1 to by-pass contact 2 of the start switch to hold 1TR. 1TR2 completes a circuit through normally closed 16CR4 to energize air valve solenoid 108. The valve is shifted to direct air against the notched nuts 35 at one or both ends of the radius dressing roller. For a diamond dressing operation, the surface speed of the grinding wheel and the dressing tool should be different. For a crush dressing operation, the surface speeds of the grinding wheel and the crushing tool should be the same. In a crush dressing operation, this initial rotation avoids the grinding action on the crusher which would occur if the crusher had to be started from standstill and brought up to crushing speed by contact of the grinding wheel rotating at grinding speed.

At the end of the first pass of the dresser, LS155 is closed to complete a circuit to energize 15CR. It also completes a circuit to energize a counter which may be set to initiate the dressing function less frequently than every grinding cycle.

15CR2 completes a circuit from 1TR2 to energize 16CR and 2TR. 16CR3 provides a holding circuit from 1TR2 to 16CR and 2TR. Normally closed 16CR4 opens to deenergize air valve solenoid 108 and cut off the flow of air driving the radius dresser. At this time, the peripheral speed of the roller is less than that of the grinding wheel if a diamond impregnated roller is used. If a crushing roller is used, its peripheral speed at this time is substantially the same as that of the grinding wheel. A crushing operation on a grinding wheel, rotating at grinding speed, is performed in a few seconds and only light pressure is exerted on the crushing roller. Conventional crush dressing with the grinding wheel rotating slowly and the crushing roller operating under high pressure, requires several minutes to complete the dressing operation.

16CR1 and 16CR2 energize radius dresser valve solenoid 107, shifting the valve to the left and directing fluid under pressure to the head end of radius dresser

cylinder 40. Piston 41 in said cylinder 40 moves the radius dresser roller into engagement with the grinding wheel 10 to dress the corners of said wheel.

2TR1 opens after a predetermined interval to deenergize and reset 1TR1. 1TR2 opens and deenergizes 16CR and 2TR.

Deenergizing 16CR opens 16CR1 and 16CR2 to deenergize valve solenoid 107 which is shifted to retract the radius dressing roller from the grinding wheel 10. 2TR is reset. At the same time that the radius dressing roller was moved into engagement with grinding wheel 10, normally closed 15CR1 opened to deenergize 14CR.

14CR3 and 14CR4 open to deenergize valve solenoid 105. The valve is shifted to the left by a spring to direct fluid under pressure to reverse the direction of the dressing tool 15. When piston 31 reaches the end of its stroke to the right, the dressing cycle is completed.

I claim:

1. Means for dressing a grinding wheel having a formed portion and a straight portion comprising a formed roller for dressing said formed portion, means for moving said roller into and out of operative engagement with said grinding wheel, a dressing tool for dressing the straight portion of said grinding wheel, means for traversing said dressing tool across said grinding wheel, control means for initiating said movement of said roller and said traverse movement of said dressing tool, and means including a timing device for withdrawing said roller before said dressing tool engages said grinding wheel.

2. Means for dressing a grinding wheel having a formed portion and a straight portion comprising a roller for dressing said formed portion, means for moving said roller into and out of operative engagement with said grinding wheel, a dressing tool for dressing the straight portion of said grinding wheel, means for traversing said dressing tool across said grinding wheel, and control means for initiating said movement of said roller and said traverse movement of said dressing tool in predetermined timed relation.

3. Means for dressing a grinding wheel having a formed portion and a straight portion comprising a formed roller for dressing said former portion, means for moving said roller into and out of operative engagement with said grinding wheel, a dressing tool for dressing the straight portion of said grinding wheel, means for traversing said dressing tool across said grinding wheel, and control means operable by said traverse means for initiating operation of said roller moving means.

4. Means for dressing a grinding wheel having a formed portion and a straight portion comprising a formed roller for dressing said formed portion, means for moving said roller into and out of operative engagement with said grinding wheel, a dressing tool for dressing the face of said grinding wheel, means for traversing said dressing tool across said grinding wheel, control means for initiating operation of said traversing means, and means operable in response to said traversing movement of said dressing tool to actuate said roller into and out of operative engagement with said grinding wheel.

5. Means for dressing a grinding wheel having a formed portion while said grinding wheel is rotating at grinding speed and a straight portion comprising a formed roller for dressing said formed portion, a dressing tool for dressing the face of said grinding wheel, and means including control devices responsive to movement of said respective dressing means relative to said grinding wheel for subjecting said grinding wheel alternately to said roller and said dressing tool.

6. Means for dressing a grinding wheel having a formed portion and a straight portion comprising a formed dressing member for dressing said formed portion, means for moving said member into and out of operative engagement with said grinding wheel, a dressing tool for dressing the face of said grinding wheel, means for traversing said dressing tool across said grinding wheel, and means for actuating said forming means in response to the traversing of said dressing means.

7. In a grinding machine, a grinding wheel support, a grinding wheel rotatably mounted thereon, means for dressing the face and corners of said grinding wheel including a dressing tool and means for moving same across the face of said grinding wheel, a corner dressing tool and means for moving same into and out of engagement with said corners, and means responsive to movement of said face dressing tool to actuate the means for moving said corner dressing tool.

8. In a grinding machine, a rotatable grinding wheel, means for dressing the face and forming the corners of said grinding wheel including a face dressing tool, means for traversing said face dressing tool across the face of said grinding wheel, a corner forming tool and means for moving same into and out of engagement with said corners, means operable when said grinding wheel is in in-operative position for initiating movement of said dressing tool across the face of said grinding wheel, means operable at the end of said movement to initiate said movement in the opposite direction and also to effect movement of said corner forming tool to form said wheel corners, and means operable after a predetermined interval to retract said corner forming tool.

9. Means for dressing a grinding wheel having a formed portion, comprising a roller for crush dressing said formed portion, means on said roller responsive to a stream of fluid under pressure for effecting rotation of said roller at a surface speed substantially the same as that of said grinding wheel, means operable thereafter for moving said roller into operative engagement with said grinding wheel, said means being effective also for cutting off the supply of fluid under pressure so that said roller is driven only by said grinding wheel, and means operable after a predetermined interval for separating said roller and said grinding wheel.

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