Aug. 25, 1970 E. W. HILLIER 3,525,180

GRINDING MACHINE AND DRESSER

Filed Oct. 2, 1967 2 Sheets-Sheet 1

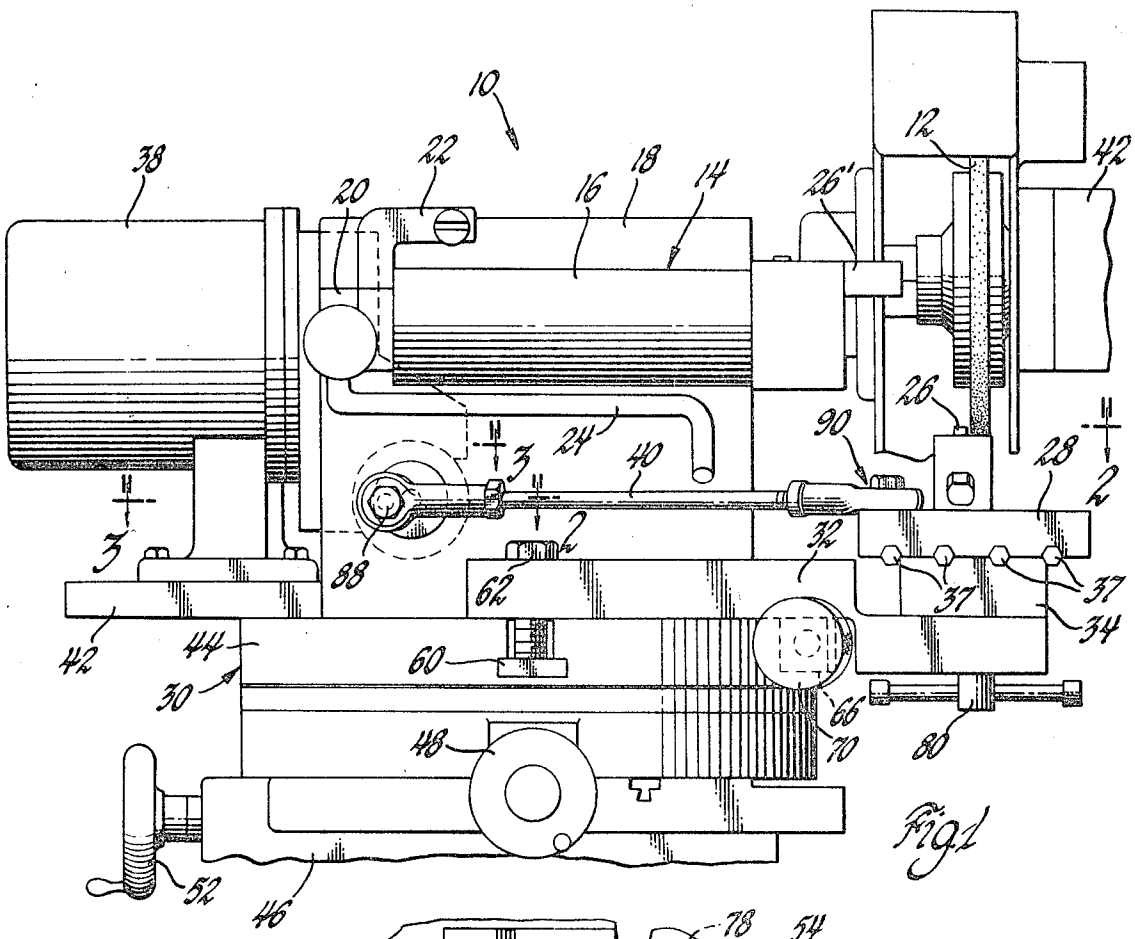


Fig. 1

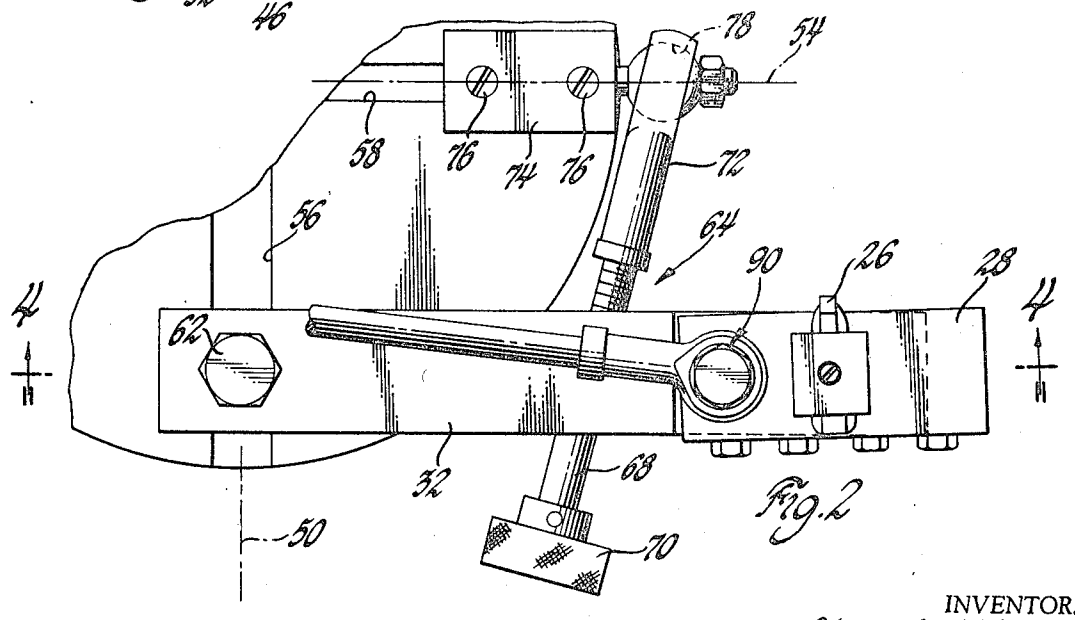


Fig. 2

INVENTOR.
Elmer W. Hillier

BY

Barnard, McGlynn & Leising
ATTORNEYS

Aug. 25, 1970 E. W. HILLIER 3,525,180

GRINDING MACHINE AND DRESSER

Filed Oct. 2, 1967 2 Sheets-Sheet 2

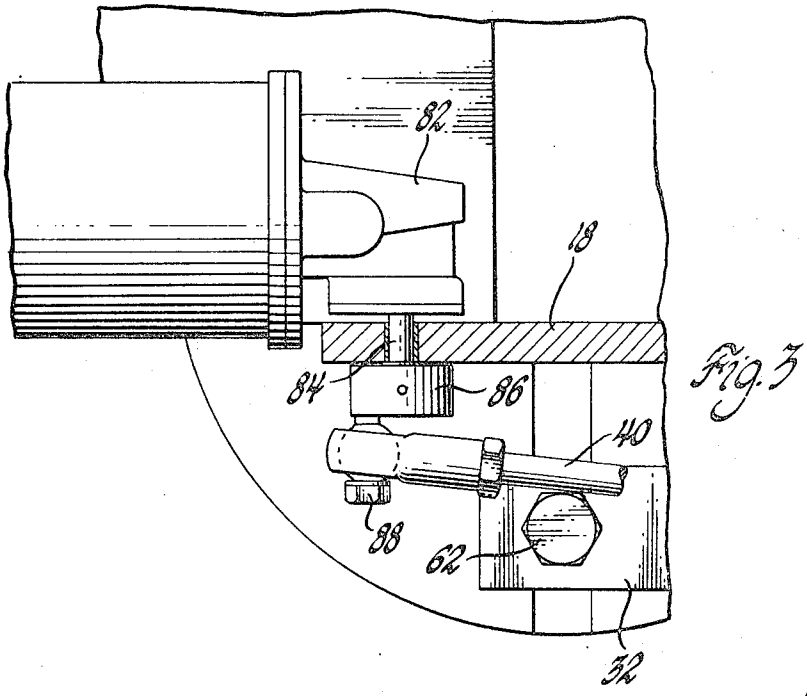


Fig. 3

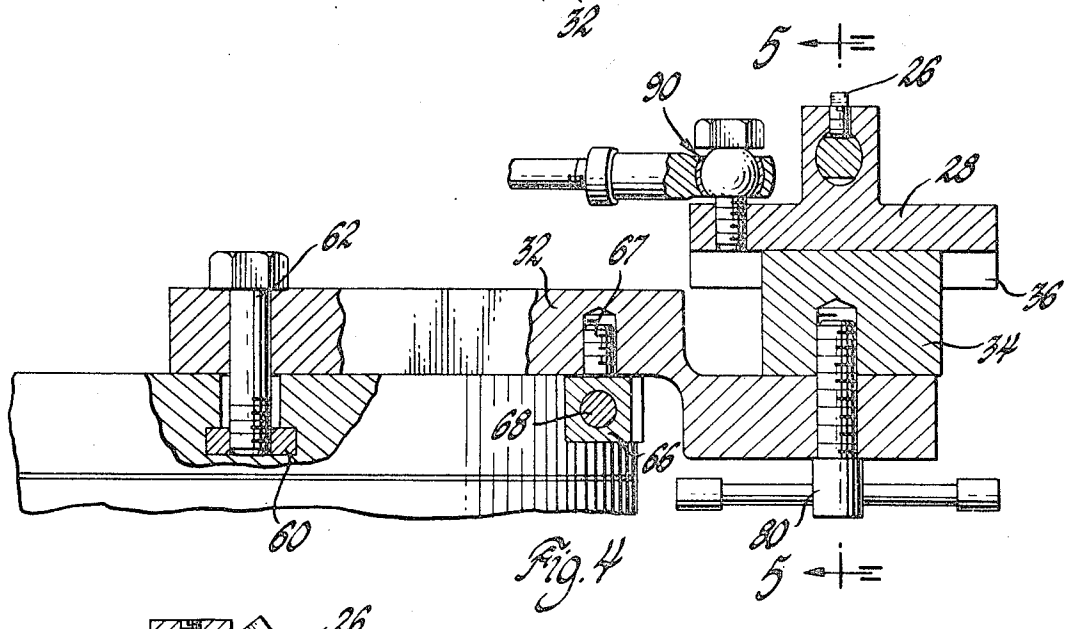


Fig. 4

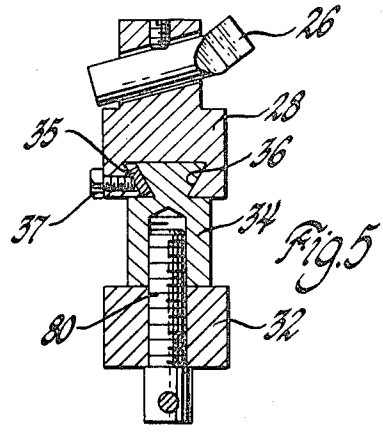


Fig. 5

INVENTOR.
Elmer W. Hillier
BY
Barnard, McGlynn & Leising
ATTORNEYS

United States Patent Office

3,525,180

Patented Aug. 25, 1970

3,525,180

GRINDING MACHINE AND DRESSER

Elmer W. Hillier, Swartz Creek, Mich., assignor of fifty percent to Robert K. Thomas, Mission Hills, Calif.

Filed Oct. 2, 1967, Ser. No. 672,094

Int. Cl. B24b 3/26, 53/02

U.S. Cl. 51—92 9 Claims

ABSTRACT OF THE DISCLOSURE

A grinding machine of the type for sharpening the points of twist drills and the like and including a drill holder for positioning a drill in engagement with the grinding surface of a grinding wheel and dressing means for dressing the grinding wheel surface. Support means supports the drill holder and the dressing means for selectively moving the drill holder and the dressing means in unison toward and away from the grinding surface so that the relative position between the drill holder and the grinding surface may be maintained constant as the grinding surface is dressed by the dressing means. In addition, the dressing means is reciprocably mounted on the support means and a power means is included for selectively reciprocating the dressing means.

Although the instant invention may be satisfactorily utilized in various grinding machine environments, it will be particularly described and illustrated in connection with a grinding machine especially adapted for sharpening or otherwise refinishing twist drills. Grinding machines which are utilized to sharpen the points of twist drills normally include a drill holder positioned adjacent the grinding surface of the grinding wheel for successively moving the points of drills into engagement with the grinding surface for sharpening thereof. Before beginning to sharpen a plurality of drills of a certain size, the operator must set the machine up by properly positioning the drill holder relative to the grinding surface of the grinding wheel. Once this is accomplished one drill after another may be sharpened by successively disposing the drills in the drill holder. After a number of drills have been sharpened, the grinding surface of the grinding wheel will be worn away and it is necessary to dress or true the grinding surface with a diamond dressing tool or the like. Heretofore in utilizing the prior art assemblies it has been necessary for the operator to reset the assembly after each dressing operation because the dressing operation changes the relative position between the drill holder and the grinding surface of the grinding wheel; thus, requiring that the drill holder again be properly positioned relative to the grinding surface to accomplish the proper grinding of the drill. As will be appreciated, the necessity to reset the machine after each dressing operation is very time consuming and results in a very inefficient utilization of the grinding machine.

Accordingly, it is an object and feature of this invention to provide a grinding machine and dresser combination wherein the workpiece holder and dresser may be moved in unison toward and away from the grinding surface.

Another object and feature of this invention is to provide a grinding machine of the type for resharpening twist drills and the like wherein the drill holder and dressing means are supported on a support means for movement in unison toward and away from the grinding surface of the grinding wheel and including means for reciprocating the dressing means relative to the support means and in a direction parallel to the grinding surface of the grinding wheel.

Other objects and attendant advantages of the present invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings wherein:

FIG. 1 is an elevational view of a preferred embodiment of the instant invention;

FIG. 2 is a fragmentary cross-sectional view taken substantially along line 2—2 of FIG. 1;

FIG. 3 is a fragmentary cross-sectional view taken substantially along line 3—3 of FIG. 1;

FIG. 4 is a fragmentary cross-sectional view taken substantially along line 4—4 of FIG. 2; and

FIG. 5 is a cross-sectional view taken substantially along line 5—5 of FIG. 4.

Referring now to the drawings wherein like numerals indicate like or corresponding parts throughout the several views, a preferred embodiment of the grinding machine of the instant invention is generally shown at **10**. The machine **10** includes a grinding wheel **12** which, as illustrated, includes a peripheral grinding surface.

A workpiece holder means is generally indicated at **14** for positioning a workpiece, such as a twist drill or the like, in engagement with the peripheral grinding surface of the grinding wheel **12**. The workpiece holder means **14** includes a first section comprising tubular member **16** which is secured to the flange **18** for rotatably supporting a second section comprising a shaft **20**. A stop **22** limits rotative movement of the shaft **20**. The shaft **20** may be manually rotated by the handle **24**. A stub shaft **26'** is oriented eccentrically relative to the shaft **20** and is adapted to receive a chuck or other appropriate means for receiving and supporting a drill or the like to be sharpened by the grinding wheel **12**. A similar device is illustrated and described in U.S. Pat. 2,827,741, which disclosure is incorporated herein by reference.

There is also included dressing means including the dressing tool **26** and the slide block **28** for dressing the grinding surface of the grinding wheel **12**.

In addition, a support means, which includes the flange **18**, the compound, generally indicated at **30**, and the arm **32**, supports the holder means **14** and the slide block **28** for selectively moving the holder means **14** and the dressing tool **26** in unison toward and away from the peripheral grinding surface of the grinding wheel so that the relative position between the holder means **14** and the grinding surface will be maintained constant as the grinding surface is dressed by the dressing tool **26**. A support block **34** is disposed on the arm **32** and includes means comprising the tongue and groove means **36** for reciprocably mounting the slide block **28** to allow reciprocating movement of the slide block **28** parallel to the peripheral grinding surface of the grinding wheel **12**. The tongue and groove means **36** includes a spacer element **35** which is maintained in position by the bolts **37**.

There is also included a power means, which comprises the auxiliary electric motor **38** and first rod **40** selectively operable for reciprocating the slide block **28**. The electric motor **38** is independent of the motor **42** which rotates the grinding wheel **12**. There is provided (but not shown) a circuit including a switch which may be manually operated for selectively operating the motor **38**. The motor **38**

is supported by a plate **42** which is in turn supported on the compound **30**.

The compound **30** has first and second portions **44** and **46** which are selectively movable along respective transverse axes. In other words, by rotating the wheel **48**, the upper or first portion **44** will move along an axis **50** as illustrated in FIG. 2. Upon rotation of the wheel **52**, the second or lower portion **46** will move along the axis **54** as illustrated in FIG. 2. The first portion **44** of the compound **30** has a pair of T-shaped channels **56** and **58** disposed therein. The arm **32** is pivotally connected to the first portion **44** of the compound for swinging movement relative to the grinding wheel **12**. More specifically, a nut element **60** is disposed in the T-shaped slot **56** and a bolt **62** threadedly engages the nut-like element **60** to secure the arm **32** to the first portion **44** of the compound whereby the arm **32** may rotate or pivot in a swinging movement about the axis of the bolt **62**.

An adjustment means is generally indicated at **64** in FIG. 2 and interconnects the arm **32** and the compound **30** for selectively swinging the arm **32** to adjust the position thereof relative to the compound. More specifically, the adjustment means **64** includes a bracket **66** rotatably connected to the arm **32** by a stud **67**. In other words, the bracket **66** is free to rotate about the axis of the stud **67** at the stud **67** threadedly engages the arm **32**. A second rod **68** has a knob **70** attached to one end thereof and is rotatably supported by the bracket **66**. The other end of the second rod **68** threadedly engages a socket member **72**. A block member **74** is secured in the T-shaped groove **58** by the bolts **76** and nut-like elements similar to nut-like element **60** previously described. A ball member **78** is supported on the compound by the block **74** and is disposed in the socket member **72** to allow universal movement of the socket member **72** relative thereto. Thus, upon rotation of the knob **70** and as a result of the threaded coaction between the rod **68** and the socket member **72**, the arm **32** is swung about the axis of the bolt **62**. There is also included means comprising the threaded member **80** for selectively allowing the support block **34** to rotate relative to the arm **32**. The threaded member **80** extends through the arm **32** and threadedly engages the support block **34** so that upon tightening of the threaded member **80**, the support block **34** is prevented from rotating relative to the arm **32**, but may be rotatably adjusted by loosening the threaded member **80**.

The auxiliary electric motor **38** transmits rotary motion through a gear box **82** to a shaft **84** which is rotatably supported by the flange **18**. A circular wheel member **86** is secured to the shaft **84** and supports an eccentric pin **88**, the pin **88** being eccentric to the axis of the shaft **84** about which it is rotated by the electric motor **38**. The rod **40** operatively interconnects the slide block **28** and the pin **88** for reciprocating the slide block upon activation of the motor **38**. The first end of the rod **40** is connected to the slide block **28** through a first ball-socket means generally indicated at **90** and the other end of the rod **40** and the pin **88** define a second ball-socket means.

In operating the machine, the knobs **48** and **52** of the compound may be rotated to place the drill holder in the proper position relative to the grinding wheel **12** for sharpening a particular size of drill. Thereafter, the dressing tool **26** is placed in the proper position relative to the grinding surface of the grinding wheel by manipulating the rod **68** and the threaded member **80**. Thereafter, a switch is actuated to operate the motor **38** whereby the slide block **28** will be reciprocated in a direction which is parallel to the grinding surface of the grinding wheel. After a number of drills have been sharpened and it becomes necessary to dress the surface of the grinding wheel **12**, the knob **48** of the compound is rotated so that the dressing tool **26** moves inwardly sufficient to dress the grinding surface of the wheel **12** when the motor **38** is actuated Since the drill holder is moved in unison with the dressing

tool **26** upon rotation of the knob **48**, the original relative position between the drill holder and the peripheral grinding surface of the grinding wheel is maintained; thus eliminating the requirement for resetting the machine and allowing the operator to immediately begin sharpening a new series of drills. It will be understood that the threaded member **80** may be loosened to rotate the support block **34** to change the direction of reciprocating movement of the slide block **28** which in some cases may be required when the grinding wheel **12** has a tapered peripheral grinding surface.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A grinding machine comprising: a grinding wheel having a grinding surface, a workpiece holder means for receiving a workpiece, dressing means for dressing said grinding surface, support means supporting said holder means and said dressing means for selectively moving said holder means and said dressing means for selectively moving said holder means and said dressing means in unison toward and away from said grinding surface so that the relative position between said holder means and said grinding surface may be maintained constant as said grinding surface is dressed by said dressing means, said workpiece holder means including afirst section supported by said support means and a second section movably connected to said first section for moving a workpiece relative to said dressing means into and out of engagement with said grinding surface, and means reciprocally mounting said dressing means on said support means for allowing reciprocating movement thereof parallel to said grinding surface, whereby said dressing means and said holder means may be moved in unison by support means to position said dressing means for dressing said grinding surface and thereafter a workpiece may be placed in said holder means and moved into engagement with said grinding surface by moving said second section thereof without changing the position of said holder means relative to said support means.

2. A machine as set forth in claim **1** including power means selectively operable for reciprocating said dressing means.

3. A machine as set forth in claim **2** wherein said power means includes an electric motor which is independent of the means for rotating said grinding wheel.

4. A machine as set forth in claim **3** wherein said electric motor is mounted on said support means.

5. A machine as set forth in claim **4** wherein said support means includes a compound having first and second portions selectively movable along respective transverse axes and an arm extending from said first portion and supporting said dressing means.

6. A machine as set forth in claim **5** including a support block supported by said arm and including means for selectively allowing said support block to rotate relative to said arm, said dressing means includes a slide block slidably supported by said support block by tongue and groove means.

7. A machine as set forth in claim **6**, wherein said arm is pivotally connected to said first portion and including adjustment means interconnecting said arm and said compound for swinging said arm to adjust the position thereof relative to said first portion of said compound.

8. A machine as set forth in claim **7** wherein said power means includes a pin eccentric to an axis about which it is rotated by said electric motor and a rod operatively interconnecting said slide block and said pin for reciprocating said slide block upon actuation of said electric motor.

9. A machine as set forth in claim **8** wherein said support means includes a flange extending upwardly from said first portion of said compound, said first section of said holder means being supported by said flange and said second section including a rotatably supported shaft

adapted to receive twist drill holder for moving a drill into and out of engagement with said grinding surface, one end of said first rod being connected to said slide block through a first ball-socket means and the other end of said rod and said pin defining a second ball-socket means, said adjustment means includes a bracket rotatably connected to said arm, a second rod rotatably supported by said bracket and threadedly engaging a socket member, a ball member supported by said compound and disposed in said socket member so that said arm is moved in said swinging movement upon rotation of said second rod, said means for allowing rotation of said support block comprises a threaded member extending through said arm and threadedly engaging said support block.

References Cited

UNITED STATES PATENTS

1,790,245	1/1931	Norton	125—11
2,855,917	10/1958	Berg	125—11

OTHELL M. SIMPSON, Primary Examiner

U.S. Cl. X.R.

125—11