Aug. 5, 1958 J. LOECY, JR 2,845,921

AUTOMATIC DEVICE FOR DRESSING GRINDING WHEELS OR THE LIKE

Filed Jan. 12, 1956 3 Sheets-Sheet 1

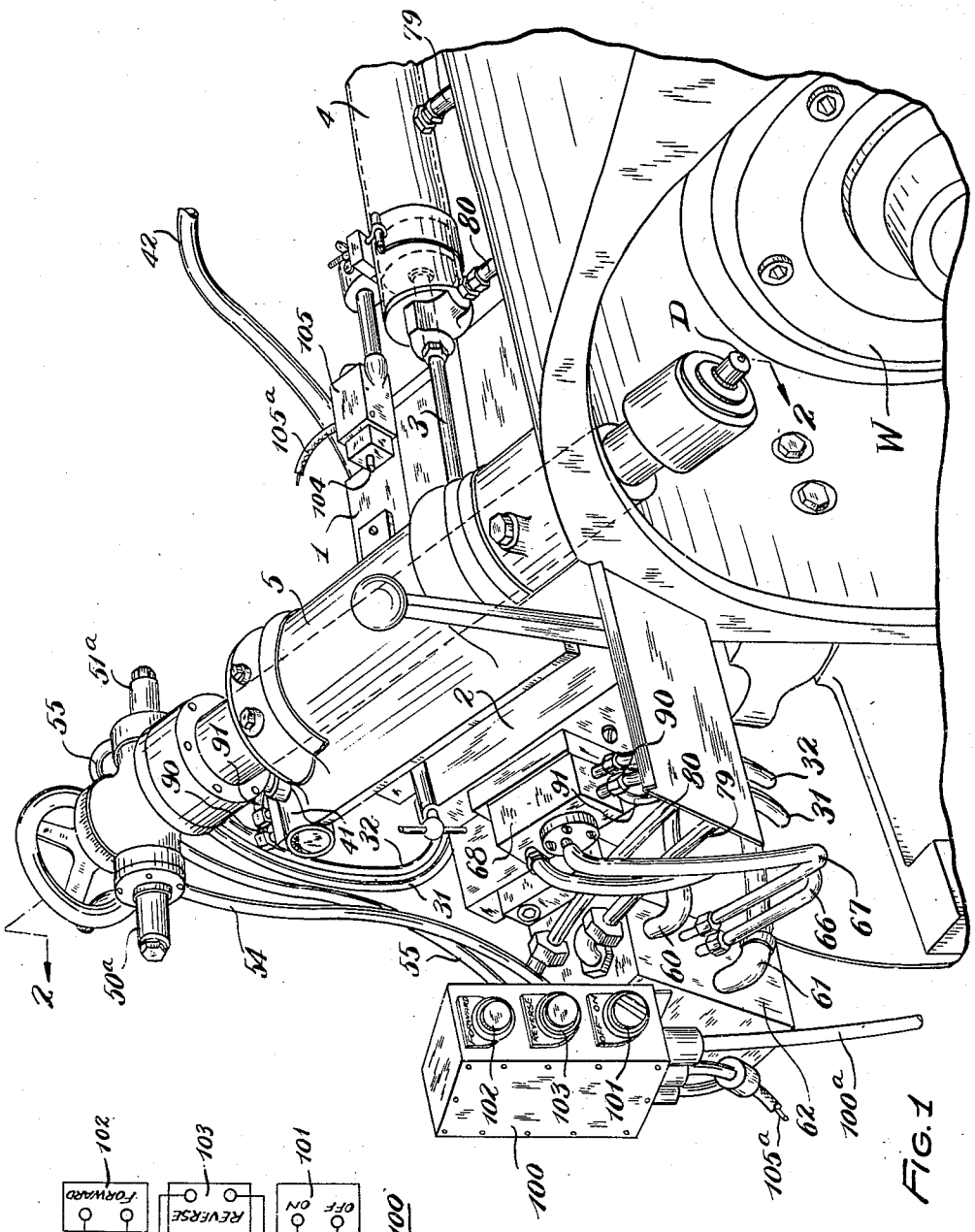


FIG. 1

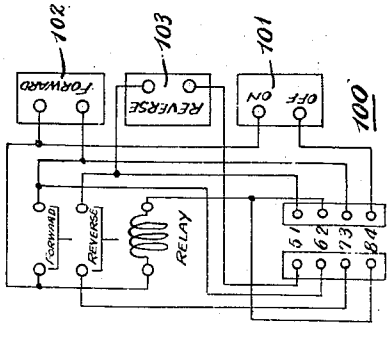


FIG. 6

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AUTOMATIC DEVICE FOR DRESSING GRINDING WHEELS OR THE LIKE

Filed Jan. 12, 1956 3 Sheets-Sheet 2

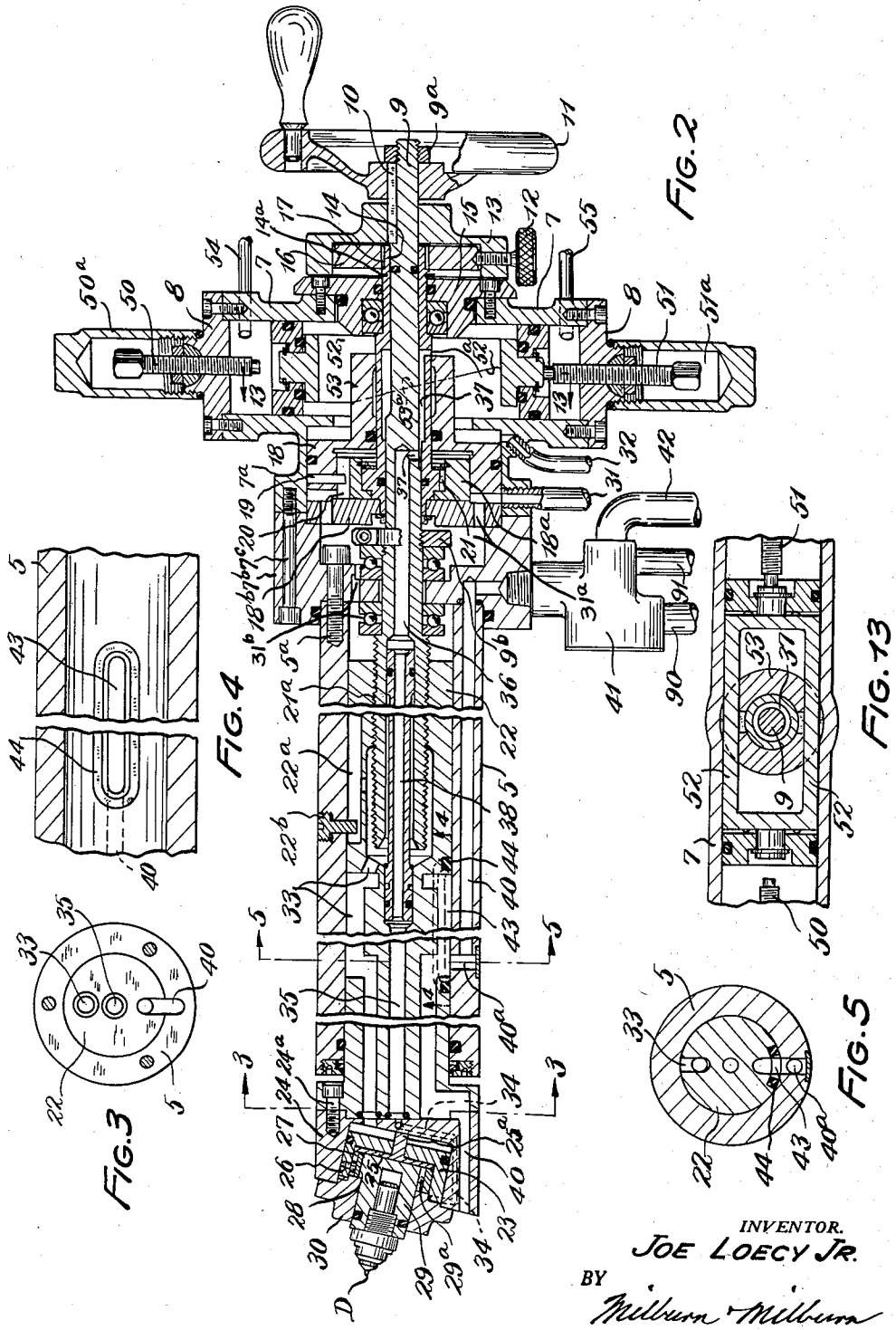


FIG. 2

FIG. 4

FIG. 13

FIG. 3

FIG. 5

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AUTOMATIC DEVICE FOR DRESSING GRINDING WHEELS OR THE LIKE

Filed Jan. 12, 1956 3 Sheets-Sheet 3

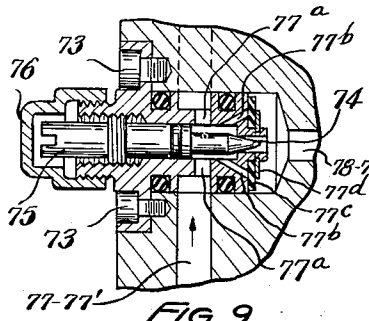


FIG. 9

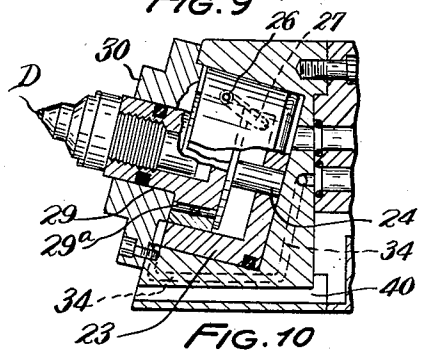


FIG. 10

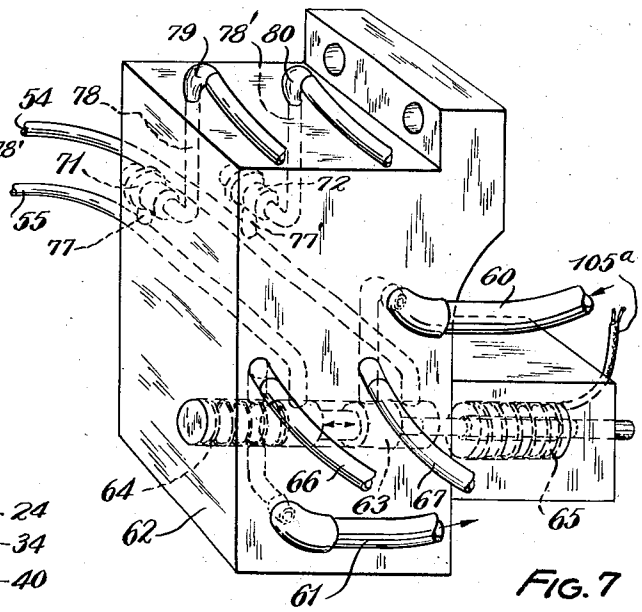


FIG. 7

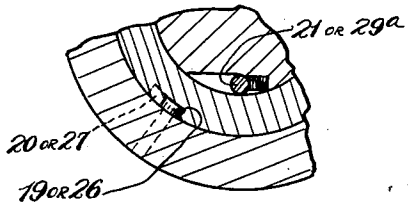


FIG. 11

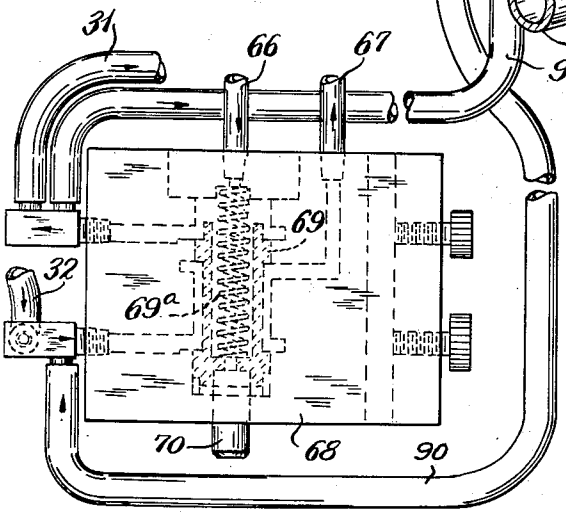
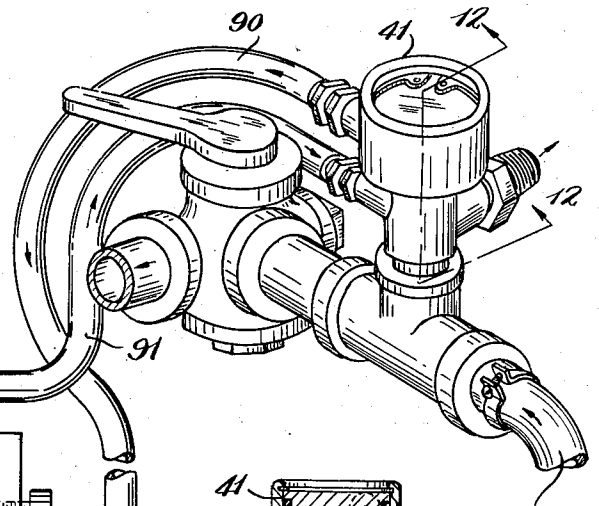


FIG. 8



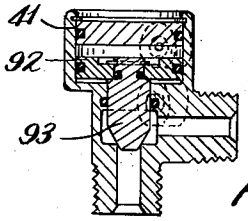


FIG. 12

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AUTOMATIC DEVICE FOR DRESSING GRINDING WHEELS OR THE LIKE

Joe Loecy, Jr., Chardon, Ohio

Application January 12, 1956, Serial No. 558,697

10 Claims. (Cl. 125—11)

This invention is for an improvement in the general art of devices for dressing grinding wheels and is related to the inventions disclosed in my Patent No. 2,628,608, of February 17, 1953, and my copending patent applications Serial No. 428,727 and Serial No. 428,728, both of which were filed on May 10, 1954, and which have issued at Patent No. 2,770,984, dated November 20, 1956, and Patent No. 2,781,035, dated February 12, 1957, respectively.

As noted in the above patent and patent applications and as is true also in the present case, the dressing element consists of a diamond and there is provided means for turning the diamond so as to present fresh surface portions and thereby increase the efficiency of the diamond and prolong its life of usefulness. As will be further observed from the above-noted cases, I have provided means for ensuring turning of the diamond always in the same direction in order that it will wear evenly over its entire surface; and there is effected a movement of the diamond holder axially towards and from the grinding wheel according to the depth of cut desired, which movement is accompanied simultaneously by the turning of the diamond holder, as just referred to. Furthermore, I have already provided improved means for effecting flow of a coolant to the point of the dressing operation, as will be seen from the above.

This brief reference is here made to my prior devices in order to facilitate an understanding of my present assembly which includes some of the general features of the above-noted cases; and reference may be had to the same for a fuller knowledge of such subject matter thereof as is embodied herein.

One general improvement of my present invention is the provision of such an organization in which there is effected an automatic operation throughout a predetermined cycle; and this constitutes one of the objects of this invention.

A further object is to devise an improved means for effecting an automatic back and forth movement of the diamond tool along the extent of the grinding wheel that is to be dressed.

Another object is to devise means for automatically controlling the supply of a coolant to the point of the dressing operation throughout a predetermined cycle of such automatic operation, as above referred to.

Another object is to devise such a combination in which such automatic operation includes the automatic manipulation of an adjusting means that may be pre-set for determining the position of the diamond tool holder with respect to the work prior to effecting such axial movement of the holder.

Another object is to devise such a combination in which there is a definite sequence of the several automatic operations, including the positioning of the tool holder for its predetermined extent of axial movement, as just referred to, the initiation of the transverse travel of the tool holder along the work, the initiation of the axial movement of the diamond tool with respect to the

work and the simultaneous turning of the diamond tool, and the supply of the coolant to the point of use.

Another object consists in providing as part of the operating means a hydraulic system which includes means for varying the hydraulic flow according to the depth of cut desired in the work at any given time and the rate of travel that might be desired for the movement of the same.

More specifically, my present organization contemplates the transverse movement of the diamond tool along the surface of the grinding wheel, the automatic reversal of the direction of such transverse movement, the automatic stopping of the travel of the diamond tool at the end of such round-trip, and the automatic discontinuance of the coolant until the operator is ready to repeat such operation. This constitutes another object of my present invention.

Another object is to devise an improved means for supplying the coolant to the point of use, including a provision whereby the flow of the coolant along the barrel containing the diamond tool-holder will not be hindered by the relative axial movement between the parts of the tool holder within the barrel during the forward movement or rearward movement of the diamond tool for positioning the same in the performance of a given cycle of operations, as above referred to.

The objects of my present invention include also the improved mechanism by which the straight-line movement of the diamond tool towards and from the work is effected and also the other various improved mechanisms and control means which are herein disclosed and by which the operation of my present device is made possible.

Other objects will appear from the following description and claims when considered together with the accompanying drawing.

Fig. 1 is a perspective view of my present organization;

Fig. 2 is a sectional view corresponding to line 2—2 of Fig. 1;

Figs. 3, 4 and 5 are sectional views corresponding to lines 3—3, 4—4 and 5—5 of Fig. 2, respectively;

Fig. 6 is a diagrammatic view illustrating the wiring of the electric control means;

Fig. 7 is a perspective view of what is herein referred to as the control and junction block of the hydraulic system;

Fig. 8 illustrates another part of the hydraulic system, particularly the control means for the operation of the diamond tool-holder within its barrel and the supply of the coolant;

Fig. 9 is a sectional view of one of the control valves in the control and junction block;

Fig. 10 is an enlarged sectional view of the diamond tool holder;

Fig. 11 is an enlarged partial view illustrating the means for effecting turning of the diamond tool in only one direction;

Fig. 12 is a sectional view of the hydraulically actuated valve for the coolant supply;

Fig. 13 is a view taken on line 13—13 of Fig. 2.

Referring now to the accompanying drawings in detail, the base 1 has a slide-way extending parallel to the longitudinal axis of the grinding wheel W to be dressed by the diamond D that is adapted to be moved towards and from the grinding wheel and along the length thereof, as will be later explained. The slide-way has mounted thereupon for straight-line movement therealong the carriage 2 with the plunger rod 3 connected thereto and extending parallel to the length of the slide-way, this plunger rod being adapted for reciprocatory movement by means of its plunger within the cylinder 4 upon the base 1.

Mounted also upon the carriage 2 is the fixed barrel or cylindrical casing 5 and adjoining enlarged housing portions 7*a* and 7*b* near the rear end thereof, there being enclosed within this combined casing and housing the mechanism for effecting the positioning of the diamond D with respect to the grinding wheel W. Adjoining the rear of these combined housing portions is the transversely disposed cylindrical barrel 7 with its end closures 8. The indexing shaft 9 extends axially through the combined casing or housing and transverse barrel, just referred to, and has key connection 10 to the hub of the hand wheel 11, and the clutch screw 12 provides releasable engagement between the micrometer dial cap 13 and the grooved disk 16 that is splined at 17 to the coaxially arranged clutch shaft 14, these parts being held in assembly by the nut 9*a* which engages the hub of the hand wheel 11 and the clutch shaft 9. There is provided a sealing ring between the indexing shaft 9 and the clutch shaft 14 and also between the clutch shaft 14 and the end head 15 which is bolted to the transversely disposed barrel 7, as well as between the end head 15 and the wall of the barrel 7. The clutch shaft 14 has a snap ring 14*a* engagement with the outer surface of the end head 15.

Surrounding the clutch shaft 14, within the enlarged housing at the rear of the barrel 5, is the plunger which comprises the outer part 18 which has only straight-line movement, as will be explained, and has an inwardly extending pin 19 in engagement with the inclined slot 20 in the companion inner plunger part 18*a* which is thereby given rotary movement. Then, in order to ensure that such rotary movement shall be transmitted to the index shaft 9 in only one direction, there is provided the one-way clutch connection 21 between the inner surface of the plunger member 18*a* and the clutch shaft 14 which transmits such movement to the indexing shaft 9 by virtue of the connection between these two shafts, as will be understood from the above. The parts 18 and 18*a* and the end member 18*b* of the plunger may be held in assembly about the forward end portion of the index shaft by spring rings, as indicated in the present drawing.

The forward end portion of the indexing shaft 9 has screw engagement 21*a* within the tubular member 22 which extends co-axially along the main barrel 5 to the forward end thereof where it has bolted thereto, as at 24*a*, the block 24 with a recess within which is slidably mounted at an angle the plunger 23 which is movable along a straight-line about the stem 25*a* centrally provided at the rear of the back stop 25. The plunger 23 has an inwardly extending pin 26 that engages in the inclined slot 27 in the ring 28 which surrounds and has one-way clutch connection 29*a* with the holder 29 of the diamond D, so as to effect turning of the tool holder in only one and the same direction. There is suitable clearance between the fixed end cap 30 and the bottom of the recess in the block 24. The structure and operation of the pin and inclined slot and the one-way clutch connection are the same at the two places referred to in the present case and may be more fully understood from my above-noted Patent No. 2,644,442.

The tubular member 22 has a longitudinal key slot 22*a* within which engages the fixed pin 22*b* in the barrel 5 so as to permit only straight-line movement of the member 22, which movement is produced by the engagement and action of the screw portion of the indexing shaft 9. Such forward and rearward straight-line movement of the tubular member 22 will cause like movement also of the tool holder with respect to the work W.

In order to effect longitudinal movement of the plunger 18—18*a*, there is connected the tube 31 for supplying hydraulic pressure to the forward side thereof, while the other side of the plunger has hose connection 32 for simultaneous relief of hydraulic pressure therefrom. Such hydraulic pressure will be exerted rearwardly upon the plunger 18—18*a* and also forwardly through the passages 31*a*, 31*b*, through the screw connection and through the communicating passages 33 so as to be exerted upon the rear end of the plunger 23 for effecting the turning of the tool holder in the manner above described. Upon such forward movement of the plunger 23, the hydraulic pressure in the front part of this chamber will have relief rearwardly through the communicating passages 34 in the block 24 and the axial bores 35 and 36 in the tubular member 22 and the indexing shaft 9, respectively, and the communicating passages 37 and 32*a* to the tube or hose 32. I have provided the tube 38 between the axial bores 35 and 36 and this tube 38 has suitable seal rings thereabout near its two ends. There are also other seal rings at the various points indicated in the present drawings and there are thrust bearings between the end head 15 and a shoulder on the clutch shaft 14 and also between the indexing shaft 9 and the two sides of the forward transverse wall to which the barrel 5 is bolted at 5*a*. This transverse wall forms part of the auxiliary casing 7*a*—7*b* and is bolted at 7*c* to an extension of the transverse barrel 7 so as to afford the enlarged chamber for the plunger 18—18*a*. These last-named bearings have engagement with a shoulder at the rear end of the screw 21*a* and the fixed nut member 9*b* on the indexing shaft 9.

The barrel 5 and the tubular member 22 are provided with the continuous passage 40 for a cooling fluid which may be supplied through the hydraulically controlled valve means 41 from a supply line 42, as will be hereinafter explained. In order to compensate for the longitudinal movement of the tubular member 22 within the barrel 5 and in order to always ensure communication between the passages just referred to for the cooling fluid, I have provided a longitudinal groove 43 in the outer surface of the tubular member 22 so as to always be in communication with the transverse port 40*a* between the longitudinal passages in the barrel 5 and the member 22. This groove 43 is surrounded by an elastic sealing ring 44 in a recess of somewhat elliptical or loop form.

Within the ends of the transverse barrel 7 there are two oppositely arranged set screws 50 and 51 with the caps 50*a* and 51*a*, respectively; and these set screws will determine the successive positions of the transverse plunger 52 which has opposite forward inclined surface portions, as indicated at 52*a*, for engagement with the inclined surfaces 53*a* of a separate shoe 53 that has bearing engagement with the plunger 18—18*a* and surrounds the clutch shaft 14 and extends rearwardly through a slot between the side portions of the transverse plunger 52. The shoe 53 has flat opposite outer surfaces in engagement with flat inner surfaces of the plunger 52 (see Fig. 13), so as to ensure only straight-line movement of the shoe 53, which is converted into rotary movement of the clutch shaft in only one direction, as above explained; and the rearwardly extending portions of the shoe 53 have their inner surfaces of curved form so as to be adapted for sliding movement upon the clutch shaft 14. This arrangement of plunger 52 and its adjustable stops serves to determine the extent of the effective movement and hence the positioning of the plunger 18—18*a*; and the plunger 52 is adapted to be moved by application of hydraulic pressure alternately to the ends thereof through the tubes 54 and 55, respectively, according to the manner to be hereinafter explained. Suffice to say at this point, the purpose of this arrangement is to determine in advance the extent of right and left adjustment of the transverse plunger 52 and hence the successive positions of the plunger 18—18*a* and the tool holder with respect to the work W. Thus, as the auxiliary plunger 52 is adjusted transversely, the position of the shoe 53 may be accordingly changed by hydraulic pressure upon the plunger 18—18*a* along the clutch shaft 14 so as to permit more or less forward or rearward move-

ment of the plunger 18—18*a* for positioning the same and the tool holder for the dressing operation, as may be more fully understood from the following and also from the disclosure in the above-noted co-pending application Serial No. 428,727.

I will now explain the hydraulic pressure system by which the several parts of my present organization are automatically operated in timed sequence. Referring to Fig. 7, the hydraulic pressure is supplied through the tube 60 and the drain or relief of such pressure is through the tube 61, both of which tubes are connected to the control and junction block 62 affixed to one end of the base 1. By means of passages provided inside the block 62, the hydraulic pressure supply line 60 and the drain or relief line 61 are connected to the bore within which is located the sleeve valve 63 which is normally forced towards the right (Fig. 7) to one operative position by the coil spring 64 and which is adapted to be moved by the solenoid 65 to its other operative position, the energization of this solenoid being under control of the relay in the electric circuit (Fig. 6), to be more fully explained. The passages from the main hydraulic pressure supply tube 60 and the main relief tube 61 are connected also to the tubes 66 and 67, respectively, which are adapted for communication at their other ends to the valve chamber within the casing 68 under control of the spring-actuated sleeve valve 69. The normal tendency of the spring of this valve is to move the same to one operative position so as to permit transmission of hydraulic pressure through the tubes 66 and 31 via this valve chamber but this valve may be moved to and held in its other position by forcing the button 70 inwardly so as to permit transmission of hydraulic pressure via this valve chamber and the tubes 67 and 32. When pressure is exerted through tubes 66 and 31, there will be relief through the tubes 32 and 67; and when pressure is exerted through tubes 67 and 32, there will be relief through tubes 31 and 66.

The casing of sleeve valve 63 has connection also through passages in the block 62 with the tubes 54 and 55 to the opposite sides of the plunger 52 in the transverse barrel 7 for effecting the predetermined successive positions of the plunger 18—18*a* in the main barrel 5. These same passages in the block 62, from the casing of the sleeve valve 63 as just referred to, have connection also through other passages with the duplicate control valves 71 and 72 which are mounted in ports in the wall of the block 62, as illustrated in Fig. 9 of the present drawing. Each of these valves has a body that is bolted, as at 73, to the block 62 and that has an axial bore therethrough with a seat at the inner end thereof for the needle valve 74 which may be set by means of screw threaded engagement 75 for any desired degree of flow therethrough. A cap 76 serves as protection for the slotted end of this adjustable screw. The stem of the valve 74 has sealed engagement within its casing, and the bore through this valve casing has direct communication with the passage 78 in the block 62; while the valve casing is provided also with a desired number of ports 77*a* for communication between the central passage of the valve casing and the passage 77 through the block 62. The inner end of each of these valves has a desired number of angularly extending ports 77*b* which communicate with the bore of the valve body and have an elastic disk 77*c* held in releasable position thereover by means of a snap ring 77*d*. With this arrangement, the hydraulic pressure through the passage 77 will cause the disk 77*c* to yield and to permit substantially full flow through the valve for communication to the tube 79 and thence to the pressure side of the plunger within the cylinder 4. The pressure at the other side of the plunger in the cylinder 4 will be relieved through the tube 80 which is connected at its other end to the inner end of the valve casing 72 so as to flow through the restricted opening past the needle valve member 74' and thence outwardly through

the side of the valve casing and the passages in the block 62 to the other side of the sleeve valve 63 which in turn permits communication with the drain or relief outlet, as above noted. It is to be observed that these two valves are so arranged that the supply of the hydraulic pressure to either side of the plunger in the cylinder 4 will have free flow through the ports 77*b* and that the drain or relief of the hydraulic pressure from either side of the plunger in the cylinder 4 will be through the passage that is restricted by the needle valve 74.

Referring again to that part of the hydraulic pressure system that is controlled by the sleeve valve 69, the chamber of this valve has means of communication through the tubes 31 and 32 with the opposite sides of the plunger 18—18*a* in the barrel 5, by which the diamond tool is moved towards and from the work W and by which the diamond tool is also turned, as above explained.

When the sleeve valve 69 is so positioned as to open communication between the tubes 66 and 31, at the same time there is established and maintained means of connection for pressure and relief through the tubes 91 and 90, respectively, that are connected to the valve chamber in casing 68 and also to the opposite sides of the plunger 92 in the chamber of the casing 41 so as to effect the opening and closing of the valve 93. This valve is connected to the plunger 92 and is adapted to thereby control the flow of the coolant from the source of supply through the tube 42 and thence to the passages 40 in the barrel 5 when the valve 93 is open.

I will now explain the electric control system and the sequence of operations of the several co-ordinated features above described. The conveniently located electric control box 100 has an "off-on" button 101 (with input line 100*a* to contacts marked 1 and 2 on the wiring diagram in Fig. 6 of the drawing), a "forward" button 102 and a "reverse" button 103, as also indicated in the wiring diagram of Fig. 6. When the carriage 2 occupies the position indicated in Fig. 1, that is at the extreme left end of its path of travel as viewed therein, the carriage 2 has physical engagement against the button 70 which thereby holds the sleeve valve 69 in the position in which placed at the completion of the round-trip cycle of operations of the machine. Under such condition there is no flow of the coolant through the valve 93 which occupies closed position. Then, when it is desired to start the operation of this device for the dressing of the grinding wheel or other work W and assuming that the button 101 is turned to "on" position (contacts 1 and 2 of the wiring diagram of Fig. 6 of the present drawing), the pressing of the "forward" button 102 (contacts 3 and 4 of the wiring diagram of Fig. 6 of the present drawing) will close the electric circuit through the relay indicated in the diagram of Fig. 6 of the drawing, which in turn will effect and maintain energization of the solenoid 65, whereupon the sleeve valve 63 will be actuated against the tendency of its spring 64 so as to change the position of this valve and to permit effective transmission of hydraulic pressure in the tubes 54 and 55 for positioning the plunger 52 transversely in the barrel 7 according to the pre-set screw at one end thereof for the desired depth of the first part of the dressing action of the diamond tool upon the work W. At the same time there is established effective transmission of hydraulic pressure in the tubes 79 and 80 and the control valves 71 and 72 so as to cause movement of the plunger in the barrel 4 for travel of the carriage 2 along the slide-way 1. As soon as the pressure of the carriage 2 against the spring button 70 is relieved by such movement of the carriage, the spring 69*a* of the valve 69 will change the position of the same so as to establish communication of pressure through the tubes 66 and 31 and relief through the tubes 32 and 67 and to thereby position the plunger 18—18*a* and its shoe 53 against the inclined surface of the transverse plunger 52 and to position the diamond tool with

respect to the work W and also to effect turning of the diamond tool in its holder in the manner above explained. At this point the diamond D has not yet engaged the end of the grinding wheel W; that is, this positioning of the diamond tool precedes such engagement with the work, as should be understood.

It is to be understood also that the screws **50** and **51** have been preliminarily set so that the engagement of the plunger **52** against one of them will determine the depth of the rough cut by the diamond during the traverse of the carriage in its one direction and the engagement of the plunger **52** with the other screw will determine the depth of the fine cut by the diamond during the return travel of the carriage. That is, one screw may be set for the depth of the rough cut, for instance the first cut in the one direction, and the other screw may be set for the depth of the fine cut, for instance the second cut in the reverse or return direction of travel of the carriage.

The travel of the diamond tool, as above described, will continue until it has traversed the full extent of the work W; whereupon the barrel **5** will engage the button **104** of a conventional micro-switch **105** that is connected through the wire **105***a* and the contacts **5** and **6** of the wiring diagram in Fig. 6 of the present drawing, to the electric circuit of the relay, above referred to, with the consequence that the relay is released and the solenoid **65** (contacts **7** and **8** of the wiring diagram of Fig. 6 of the drawing) is de-energized and the sleeve valve **63** is released to the influence of its spring **64** which at once reverses the direction of hydraulic pressure in the barrel **7** and the barrel **4** so as to thereby cause movement of the plunger **52** against the screw in the other end of the barrel **7** for re-positioning of the plunger **18**—**18***a* in the barrel **5** and to thereby also reverse the direction of travel of the carriage **2**. Such return movement of the carriage will be accompanied by the second or fine dressing of the grinding wheel W. It is to be understood that this re-positioning of the diamond tool is not accompanied by any turning of the same as the one-way clutch mechanism, above described, permits turning of the diamond tool in only one direction, as above explained. During this reverse travel of the carriage **2**, there is still maintained the hydraulic pressure in the barrel **5** so as to cause the plunger **18**—**18***a* and the diamond tool to assume and to be held in the predetermined position; and likewise the flow of the coolant has not been disturbed. The hydraulic pressure in the barrel **5** and in the casing **41** of the valve **93** for the cooling fluid will not be disturbed until the carriage returns to its original or starting position where it again engages against the button **70** of the sleeve valve **69**, whereupon the position of this valve will be changed against the spring thereof so as to reverse the hydraulic pressure in the barrel **5** and in the casing **41**, with the result that the flow of the coolant is then discontinued. Since, under the condition now existing, there is no hydraulic pressure within the barrel **4** for moving its plunger towards the right, as viewed in Fig. 1 of the drawing, the device will remain in the position just referred to until the "forward" button is again pressed for repeating the operation.

It is to be understood that before initiation of the dressing operation, as above outlined, the clutch screw **12** will be loosened and the diamond tool will be backed up by turning the hand wheel **11** to the extent required for clearing a new grinding wheel W that is to be dressed, whereupon the clutch screw **12** will be tightened and the screws **50** and **51** will be set for the desired depths of cuts.

Also, it is to be understood that the outward and rotary movements of the diamond tool will be effected while it occupies preliminary position beyond the end of the grinding wheel or other work W, in each instance, and that there will be only one turning of the diamond tool for each round-trip of the same along the work which is to be dressed.

What I claim is:

1. In a device of the class described, a slide-way, a plunger-operated carriage means adapted for straight-line movement back and forth upon said slide-way, a barrel mounted upon said carriage means and extending in a direction normal to the path of movement of said carriage, a plunger means within said barrel, a tool holder upon the outer end of said plunger means and adapted for movement with said plunger means towards and from the work, means in the rear end of said barrel adjustable transversely of the axis of said barrel for determining the position of said plunger means in said barrel, hydraulic means for effecting actuation of said means, a two-way valve for controlling said hydraulic means so as to thereby effect initiation of movement of said carriage and for adjusting said position-determining means, a second valve for said hydraulic means located at one end of the path of travel of said carriage and adapted for operation by the initiation of movement of said carriage for effecting the positioning of said plunger means in said barrel, means adapted to be actuated by the arrival of said carriage at its other terminus for changing the position of said two-way valve so as to re-adjust said position-determining means and to control said hydraulic means for reversing the direction of travel of said carriage upon said slide-way.

2. In a device of the class described, a slide way, a plunger-operated carriage means adapted for straight-line movement back and forth upon said slide-way, a barrel mounted upon said carriage and extending in a direction normal to the path of movement of said carriage, a plunger means within said barrel, a tool holder adapted for one-way rotatable adjustment co-axially upon the outer end of said plunger means and adapted for movement with said plunger means towards and from the work, plunger-operated means in the rear end of said barrel adjustable transversely of the axis of said barrel for determining the position of said plunger means within said barrel, hydraulic means for effecting actuation of said means, a two-way spring-actuated valve for controlling said hydraulic means so as to effect initiation of movement of said carriage and for adjusting said transverse means, a second spring-actuated valve adapted for control of said hydraulic means and adapted for operation by the initiation of movement of said carriage for effecting positioning of said plunger means, said last-named valve being located at one end of the path of travel of said carriage, means for converting the positioning movement of said plunger means into one-way rotary movement of said tool-holder, means adapted to be actuated by the arrival of said carriage at the other end of its path of travel for releasing said two-way valve so as to re-set said transversely adjustable means and to reverse the direction of travel of said carriage means.

3. The same structure as recited in claim 1 hereof and with the addition of means for supplying a cooling medium to the work, and means controlled by the operation of said second-named valve for effecting the supply of said cooling medium.

4. In a device of the class described, a slide-way, a plunger-operated carriage means adapted for straight-line movement back and forth upon said slide-way, a barrel mounted upon said carriage and extending in a direction normal to the path of movement of said carriage, a plunger means within said barrel, a tool holder upon the outer end of said plunger means and adapted for movement with said plunger means towards and from the work, plunger-operated means adjustable in the rear end of said barrel for determining the position of said plunger means within said barrel, hydraulic means for effecting actuation of said means, a two-way spring-actuated valve for said hydraulic means and normally adapted to occupy a predetermined position and having control means for

adjusting the same to position for permitting said hydraulic means to effect operation of said positioning-determining means and of said carriage means, a second spring valve for said hydraulic means located at one end of the path of travel of said carriage means and adapted to occupy position for permitting said hydraulic means to effect positioning of said plunger means in said barrel, means at the other end of the path of travel of said carriage means for engagement thereby for releasing the control means of said two-way valve so as to permit the same to assume its predetermined position and thereby permit said hydraulic means to re-adjust said position-determining means in the rear of said barrel and to also reverse the direction of movement of said carriage.

5. The same structure as recited in claim 2 hereof and in which said plunger means in said barrel includes companion rearward and forward members with means for converting the straight-line movement of said plunger means into rotary movement of said rearward member and in which said rearward and forward members have screw engagement with each other and in which said forward member is keyed so as to have only straight-line movement, and in which said tool holder is mounted upon said forward member of said plunger means in the manner described.

6. The same structure as recited in claim 2 hereof and in which said hydraulic means for operation of the plunger of said carriage back and forth includes a valve upon each side of said plunger, each of said valves having a substantially fully open port for supplying pressure towards the plunger of said carriage means and an adjustable port upon the other side of said plunger for the relief flow so that the hydraulic fluid may be restricted to the desired extent in the one direction.

7. The same structure as recited in claim 2 hereof and in which the plunger means in said barrel includes companion rearward and forward members and in which said rearward member has means for converting the straight-line movement of said plunger means into rotary movement of said rearward member, and in which said rearward and forward members have screw engagement with each other and in which said forward member is keyed so as to have only straight-line movement, said tool holder being mounted upon said forward member of said plunger means in the manner described, and with the addition of means for supplying a cooling medium along the interior of said barrel and to the work, said plunger means being provided with ducts for said cooling medium and having a longitudinal slot between said rearward and forward members so as to ensure continuous passage therefor for all positions of said members.

8. In a device of the class described, a valve body having a co-axial port through one end thereof, a valve member mounted in said body and adapted for variable position within said port so as to vary the flow therethrough, said valve body having a laterally disposed passage therethrough in communication with said co-axial port, said valve body having other passage means therein about said co-axial port, an elastic annular sealing disk surrounding said co-axial port and positioned over the outer side of said other passage means for releasably closing the same, said valve body having duct means therethrough in communication with said other passage means, and means for releasably holding said elastic disk in closed position, whereby said elastic disk will yield to flow pressure to permit substantially free flow therethrough in only the one direction while the flow in the other direction will be restricted according to the position of said valve member in said co-axial port.

9. In a device of the class described, a slide-way, a plunger-operated carriage means adapted for straight-line movement back and forth upon said slide-way, a barrel mounted upon said carriage and extending in a direction normal to the path of movement of said carriage, a plunger means within said barrel, a tool holder upon the outer end of said plunger means and adapted for movement with said plunger means towards and from the work, plunger-operated means adapted for straight-line adjustment back and forth in the rear end of said barrel for determining the position of said plunger means within said barrel, hydraulic means for effecting actuation of said means, a two-way spring-actuated valve for said hydraulic means and adapted to normally occupy a predetermined position, electric means for moving said valve against said spring to position for permitting said hydraulic means to effect operation of said adjustable means in one direction and to effect also operation of said carriage means, a second spring-actuated valve for said hydraulic means located at one end of the path of travel of said carriage means and normally adapted to occupy position for permitting said hydraulic means to effect positioning of said plunger means within said barrel, an electric switch at the other end of the path of travel of said carriage means for operation thereby for releasing said electric means so as to permit said first-named valve to assume its normal predetermined position, said predetermined position of said two-way valve corresponding to the movement of said adjustable means in the opposite direction and the movement of said carriage means in its opposite direction, thereby permitting said hydraulic means to re-set said adjustable means in the rear of said barrel and also to reverse the direction of travel of said carriage means.

10. The same structure as recited in claim 9 hereof and in which said electric means includes a solenoid and electric switch means for controlling the energization of said solenoid so as to effect movement of said first-named valve to either position and thereby determine the direction of the hydraulic pressure and hence the direction of movement of said carriage means and the direction of movement of said adjustable means in the rear end of said barrel.

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