Aug. 23, 1932. P. PLANTINGA 1,873,152

SPLASH GUARD MECHANISM FOR GRINDING MACHINES

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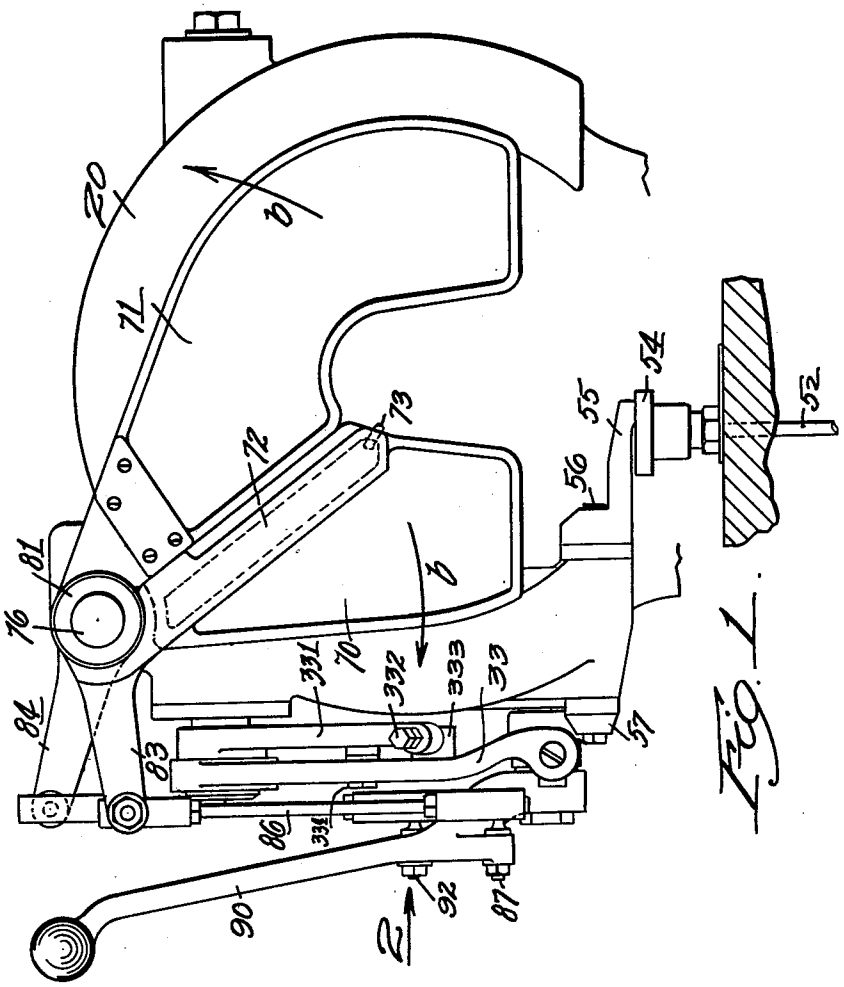

Fig. 1.

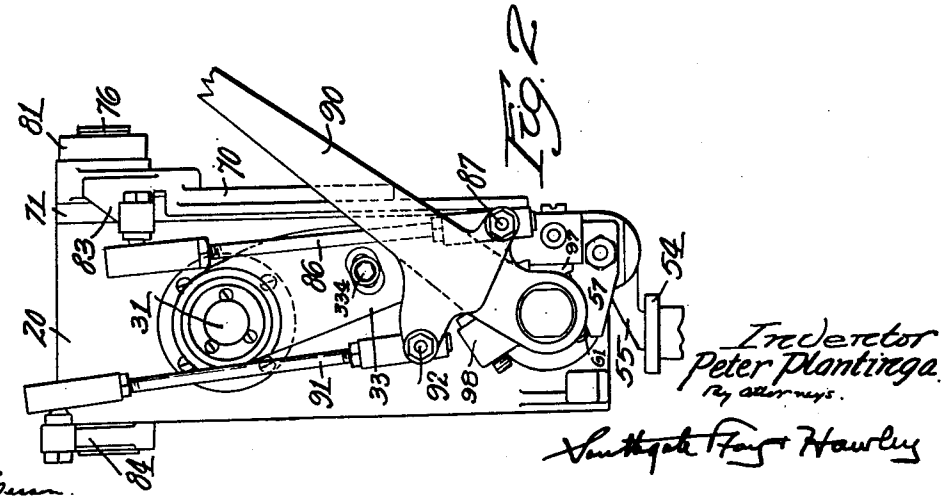

Fig. 2

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Fig. 3.

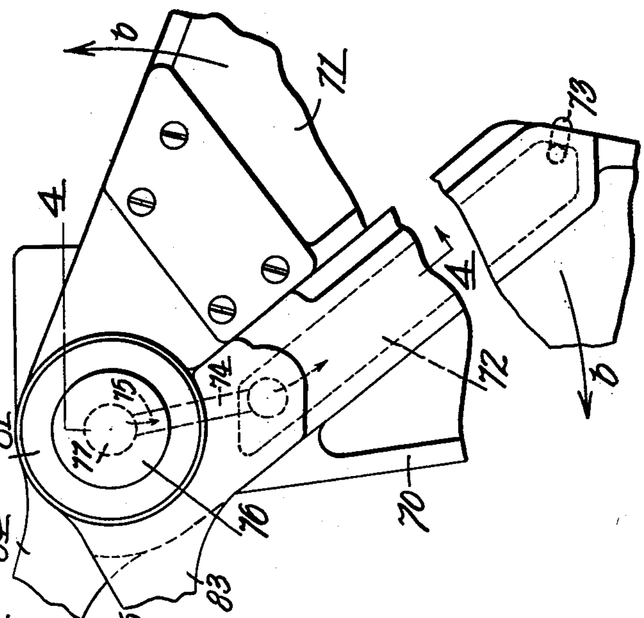
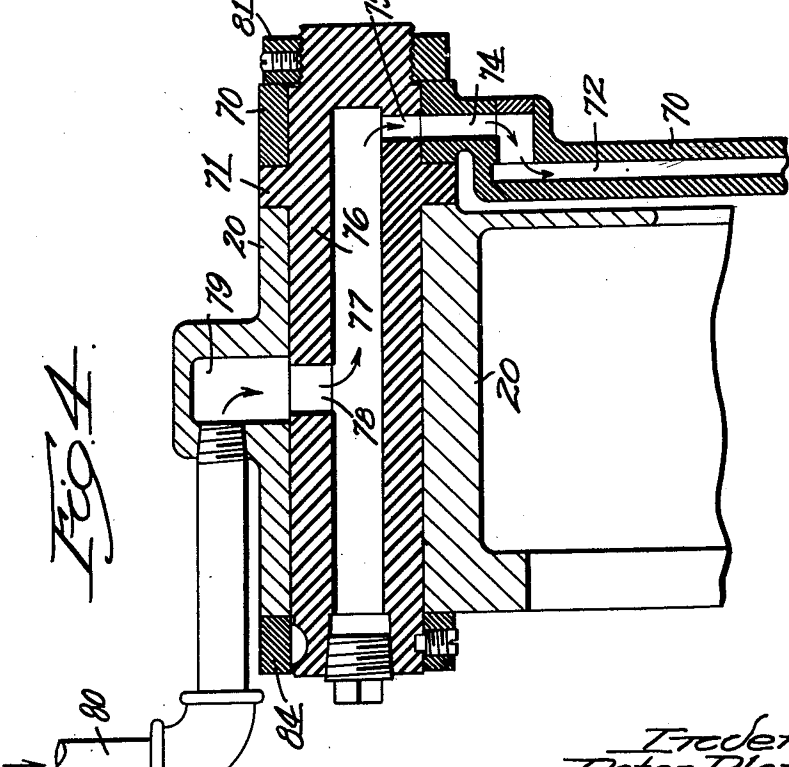


Fig. 4.



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SPLASH GUARD MECHANISM FOR GRINDING MACHINES

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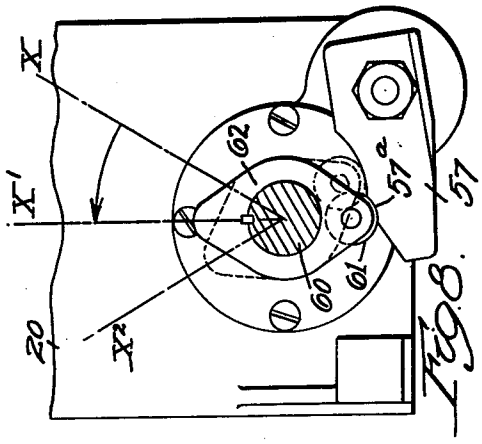

Fig. 8.

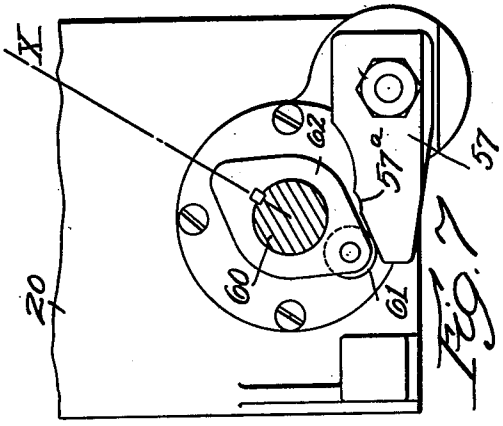

Fig. 7

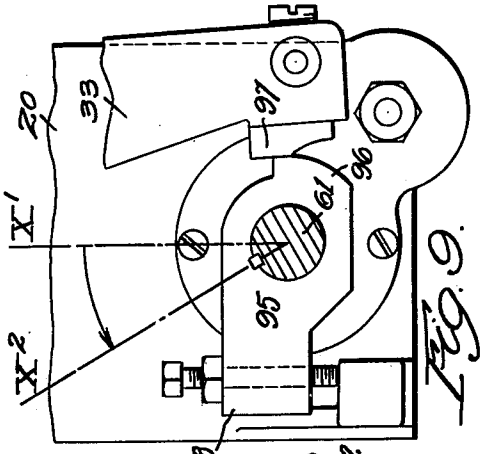

Fig. 9.

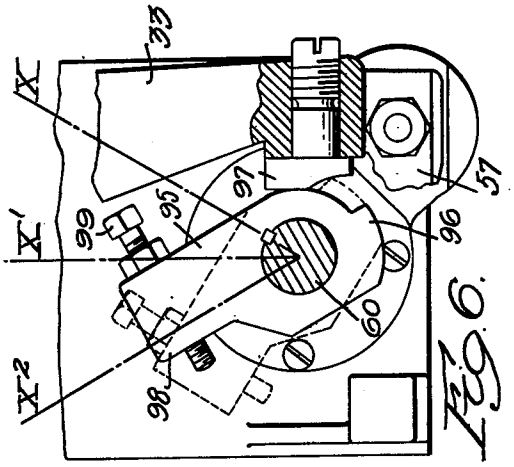

Fig. 6.

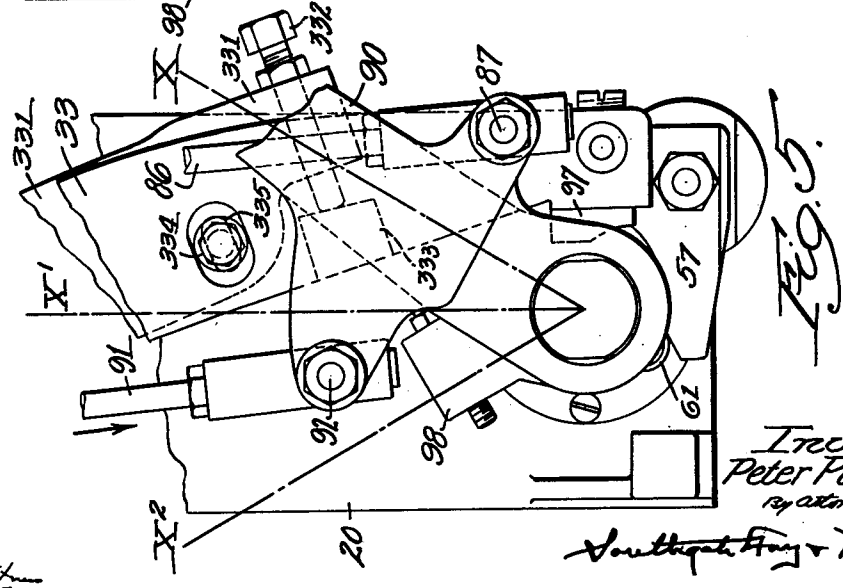

Fig. 5.

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SPLASH GUARD MECHANISM FOR GRINDING MACHINES

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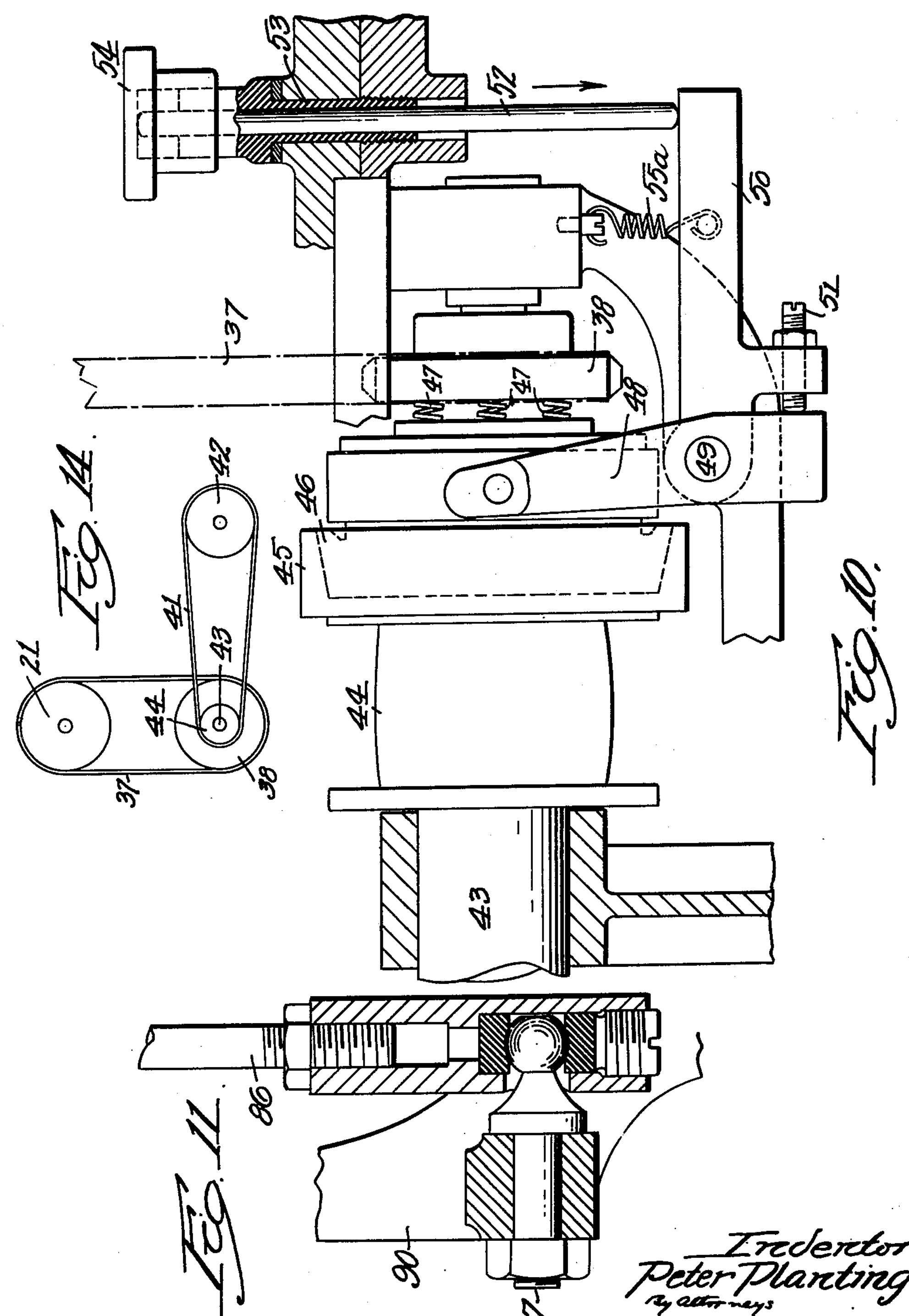

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SPLASH GUARD MECHANISM FOR GRINDING MACHINES

Filed Sept. 30, 1930 5 Sheets-Sheet 5

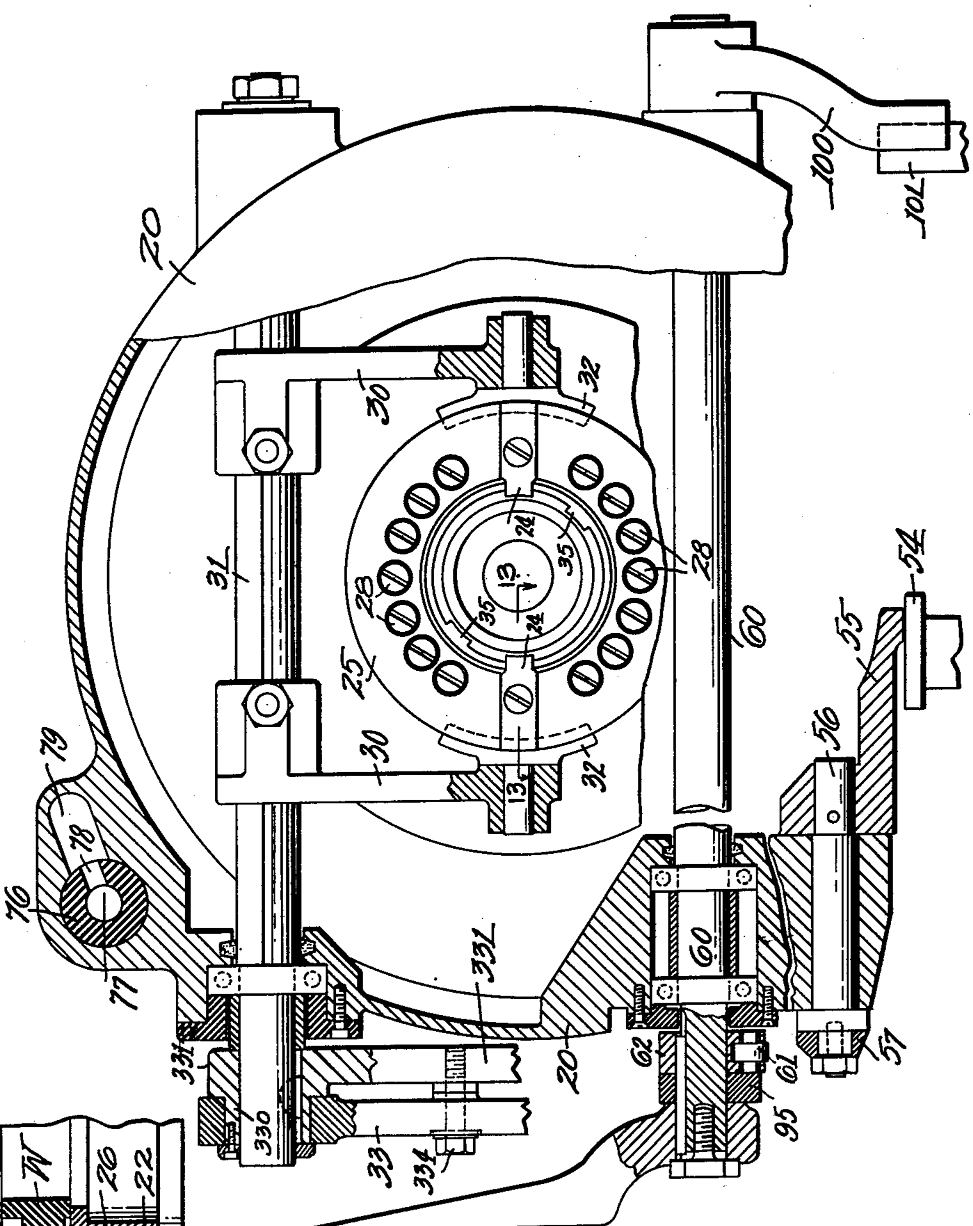

Fig. 12.

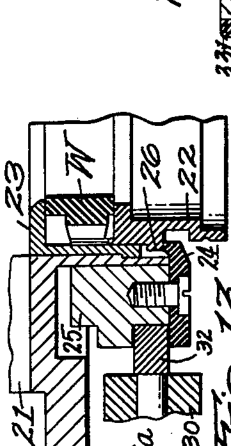

Fig. 13

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UNITED STATES PATENT OFFICE

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SPLASH GUARD MECHANISM FOR GRINDING MACHINES

Application filed September 30, 1930. Serial No. 485,471.

This invention relates to grinding machines and particularly to devices for enclosing the grinding wheel and work during the grinding operation and for preventing splashing of the water sprayed on the wheel and work.

It is the general object of my invention to provide an improved splash guard for such purposes, together with improved operating mechanism therefor.

Further objects of the invention are to provide improved mechanism for controlling the work driving clutch for controlling the water supply for the wheel and work, and for releasing the work in the work holder.

In the preferred form, all of these mechanisms are controlled by a single handle which may be moved to a given position to shut off the water, open the splash guards and stop the work, and to a further position to release the work.

My invention further relates to arrangements and combinations of parts which will be hereinafter described and more particularly pointed out in the appended claims.

A preferred form of the invention is shown in the drawings, in which

Fig. 1 is a front elevation of my improved splash guard mechanism;

Fig. 2 is a side elevation thereof, looking in the direction of the arrow 2 in Fig. 1;

Fig. 3 is an enlarged front elevation of certain parts;

Fig. 4 is a detail sectional side elevation, taken along the line 4—4 in Fig. 3;

Fig. 5 is an enlarged side elevation of certain parts;

Figs. 6 and 7 are detail side elevations, partly in section, and showing additional operating parts;

Figs. 8 and 9 are views similar to Figs. 7 and 6 respectively, but showing the corresponding parts in different positions;

Fig. 10 is a side elevation of the work driving mechanism;

Fig. 11 is a sectional side elevation of a universal connector to be described;

Fig. 12 is an enlarged front elevation, partly in section, and showing the work releasing connections;

Fig. 13 is a partial sectional plan view of the work holder, and

Fig. 14 is a diagrammatic view showing the work driving connections.

The general type of machine to which my improvements relate is shown in the prior patent to Drake, No. 1,662,240, issued March 3, 1928.

Referring to the drawings, I have shown portions of a work head 20 in which a hollow work-driving spindle 21 (Fig. 13) is rotatably mounted. The work W is preferably mounted in a removable work holder 22 and is pressed against an inwardly projecting flange 23 by fingers 24 mounted on a ring 25 and engaging a flange 26 on the periphery of the work holder 22. The ring 25 is yieldingly pressed axially in the direction of the arrow *a* in Fig. 13 by a series of springs held in place by screws 28 (Fig. 12).

Arms 30 are keyed or pinned to a rock shaft 31 (Fig. 12) and are provided with yoke members 32 fitting a circumferential groove in the ring 25. The rock shaft 31 is supported in fixed bearings in the work head 20 and is provided with a depending lever 33 by which it may be rocked to move the ring 25 axially outward, permitting the work holder 22 to be turned so that notches 35 therein may be made to coincide with the fingers 24. In this position, the work holder may be freely removed axially from the work spindle and another work holder may be easily substituted therefor.

To permit relative adjustment between the depending lever 33 and the arms 30 keyed to the rock shaft 31, I preferably mount the lever 33 loosely on the hub 330 (Fig. 12) of an arm 331 which is keyed to the rock shaft 31. An adjusting screw 332 (Fig. 5) is threaded into the lower end of the arm 331 and engages an abutment 333 on the side of the depending lever 33. A clamping screw 334 (Fig. 12) is threaded into the arm 331 and extends through a slot 335 in the lower end of the lever 33.

By adjusting the screw 332 and tightening the screw 334, the depending lever 33 may be fixed in a desired position relative to the shaft 31 and arms 30. The adjustment is provided

to accommodate differences in the dimensions of the work or work holders.

For more complete details of the work holder, reference is made to the prior application of A. M. Drake, Serial Number 295,208, filed July 25, 1928.

The work spindle 21 (Fig. 14) may be rotated in any convenient manner, as by a chain 37 from a sprocket 38, rotatably mounted in alignment with a countershaft 43. A small pulley 44 is mounted on the shaft 43 and is connected by a belt 41 to a driving pulley or drum 42. One member 45 of a friction clutch is connected to the pulley 44 and the other member 46 of the clutch has a driving connection to the sprocket 38 and is yieldingly pressed into engagement with the member 45 by a plurality of springs 47.

A yoke lever 48 is mounted on a fixed pivot stud 49 and comprises means by which the friction clutch may be disengaged. An intermediate lever 50 is also mounted on the pivot stud 49 and is provided with a contact screw 51 adjustably mounted in the lever 50 and engaging a depending portion of the yoke lever 48. At its outer end, the lever 50 engages the lower end of a plunger 52, slidable in a fixed vertical bearing 53 and having an enlarged head 54. A spring 55^a normally raises the lever 50 and plunger 52.

The head 54 (Fig. 2) is engaged by the under face of an offset arm 55 (Fig. 12) mounted on a stud or short shaft 56 rotatable in a fixed bearing in the work head 20 and having an actuating arm 57 (Fig. 7) secured at its outer end. The arm 57 normally occupies the working position shown in Fig. 7, in which position the arm 55 is raised and the clutch members 45 and 46 are engaged.

A manually operated rock shaft 60 is mounted adjacent the arm 57 and a cam roll 61 is mounted on a support 62 fixed to the rock shaft 60. When the rock shaft is moved from the position shown in Fig. 7 to the full line position shown in Fig. 8, the roll 61 engages a cam face on the arm 57, forcing the arm downward to the position shown in Fig. 8 and thus disengaging the clutch.

If the rock shaft 60 is given a further angular movement to the dotted line position shown in Fig. 8, the cam roll 61 remains in contact with a portion of the arm 57 which is substantially concentric with the axis of the rock shaft 60 and the friction clutch is thus held in disengaged position.

Splash guards 70 and 71 are mounted at the end of the work head 20 and are designed to separate when the work is to be inspected or changed, and to move toward each other into close engagement when a grinding operation is to be performed.

The guard 70 not only acts to prevent splashing but is also used to supply water to the wheel and work. For this purpose the guard 70 is provided with an inner passage 72 (Fig. 4) communicating with an outlet or nozzle 73 through which water may be supplied directly to the grinding point.

The passage 72 is connected through an offset passage 74 to a passage 75 in the hub portion 76 of the second splash guard 71. The hub 76 has an axial passage 77 connecting the passage 75 to a radial inlet passage 78, which is in communication with a passage 79 in the work head 20 when the splash guards are in operative position. A supply pipe 80 communicates with the passage 79. The splash guard 70 is loosely mounted on the hub 76 and is secured thereon by a collar 81.

When the guards are in operative position, the passages 74 and 75 are in alignment and also the passages 78 and 79. When the parts are separated by movement in the direction of the arrows b (Figs. 1 and 3), these passages are moved out of alignment with each other and the flow of water is thus interrupted.

The splash guard 70 is provided with an actuating arm 83, and a similar actuating arm 84 for the splash guard 71 is fixed to the rear end of the hub 76. The arm 83 is connected by a link 86 to a stud 87 mounted on a projection from one side of a manually controlled handle 90. The arm 84 is similarly connected by a link 91 to a stud 92 on a projection from the opposite side of the lever or handle 90.

The links 86 and 91 are provided with universal joint connections at their upper and lower ends, the detail construction of one of these joints being clearly shown in Fig. 11. These links are adjustable as to length and also comprise suitable means for taking up all lost motion.

The handle 90 is fixed to the rock shaft 60 previously described on which the cam roll 61 is mounted. A cam member 95 (Fig. 6) is also fixed to the rock shaft 60 and has a cam lug or projection 96 adapted to engage a cam plate 97 fixed in the lower end of the work releasing lever 33. The cam member 95 also has a projecting portion 98 in which an adjustable stop screw 99 is mounted.

Having described the details of construction of my improved mechanism, the method of operation thereof is as follows:

The lever 90 is normally in the position shown in Figs. 2 and 5 and indicated by the line X in Fig. 6. In this position the splash guards are closed, the water passages are open, the driving clutch is engaged, and the work is securely held in the work spindle.

If it is desired to stop the work for inspection or gauging, the handle 90 is moved to a substantially upright position, as indicated by the line X′ in Figs. 5, 6 and 8. This movement causes the cam roll 61 to move to the position shown in Fig. 8, disengaging the friction clutch as previously described. The

splash guards 70 and 71 are also separated sufficiently to permit inspection and this angular movement is sufficient to bring the water passages out of alignment and thus stop the flow of water to the wheel and work. The work may then be readily inspected and gauged if desired.

A notch or recess 57ª (Figs. 7 and 8) retains the handle 90 in upright position and prevents accidental displacement thereof, which might cause injury to the operator.

The handle 90 may then be returned to its original position for further grinding operations, or it may be swung over to the position indicated by the line X^2 in Figs. 5 and 9, by which movement the splash guards will be further opened and the lever 33 will be moved to the position indicated in Fig. 9, in which position the pressure on the work holder is released so that the work holder may be readily removed and replaced.

I am thus able to accomplish a number of desired and related results by simple movements of the single operating handle 90.

If it is considered desirable to actuate the rock shaft 60 automatically as well as manually, the rock shaft may be provided with a depending arm 100 (Fig. 12) adapted to be engaged by a dog 101 on a stationary part of the machine when the table is given increased travel to separate the wheel and the work prior to replacement of the work.

Having thus described my invention and the advantages thereof, I do not wish to be limited to the details herein disclosed, otherwise than as set forth in the claims, but what I claim is:—

1. In a grinding machine, a rotating work-supporting member, a pair of splash guards movable across the face of said member in a plane perpendicular to the axis of rotation of said member, and manually operable means to move said guards simultaneously in opposite directions away from the axis of rotation of the work.

2. In a grinding machine, a splash guard movable to operative and inoperative positions and having a passage through which water may be delivered to the wheel and work when the guard is in operative position, water supplying connections to said passage, and means to move said guard to operative and inoperative positions.

3. The combination in a grinding machine as set forth in claim 2, in which the water supplying connections are effective to deliver water only when the splash guard is in operative positon.

4. In a grinding machine, a splash guard, a work holding clutch, work driving mechanism, and a single means effective to move said guard to inoperative position, to stop the work, and to open the clutch to release the work.

5. In a grinding machine, a splash guard, a work holder, work driving mechanism, and a single means effective by one movement to move said guard to inoperative position and to stop the work, and by a further movement to release the work.

6. In a grinding machine, work driving mechanism, a work holder, and means effective by one movement to stop said driving mechanism and work, and by a further movement to release the work.

7. In a grinding machine, means to supply water to the holder and work, a splash guard, a work holding clutch, work driving mechanism, and a single means effective to control said splash guard, said water supply, and said driving mechanism and to open and close said clutch.

8. In a grinding machine, means to supply water to the holder and work, a splash guard, a work holding clutch, work driving mechanism, and automatic means effective to control said guard, said water supply, and said driving mechanism and to open and close said clutch at predetermined points in the operation of the machine.

9. In a grinding machine, a pair of splash guards, a hand lever, and operating connections from said lever to each of said guards, through which movement of said lever in one direction causes movement of said guards in opposite directions.

10. In a grinding machine, work driving mechanism, a work holder, control means effective by movement to an intermediate position to stop the driving mechanism and work and by a further movement to release the work, and a device effective to yieldingly retain said control means in intermediate position.

In testimony whereof I have hereunto affixed my signature.

PETER PLANTINGA.