F. M. FURBER.

GRINDING MACHINE.

APPLICATION FILED FEB. 21, 1913.

1,189,247. Patented July 4, 1916.

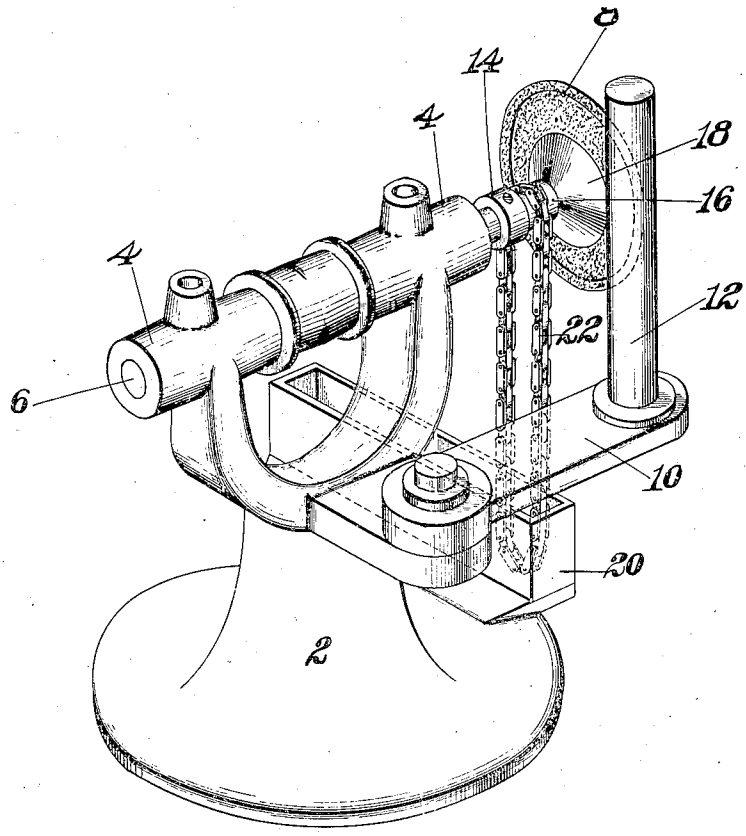


Fig. 1.

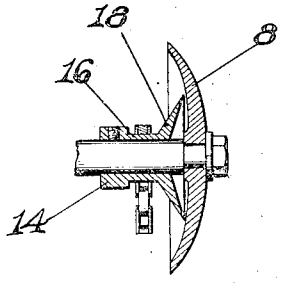


Fig. 2.

WITNESSES.

Elizabeth C. Coupe

C. Blanche Hargraves

INVENTOR.

Frederick M. Furber

By his Attorneys

Nelson W. Howard

UNITED STATES PATENT OFFICE.

FREDERICK M. FURBER, OF REVERE, MASSACHUSETTS, ASSIGNOR TO UNITED SHOE MACHINERY COMPANY, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

GRINDING-MACHINE.

1,189,247. Specification of Letters Patent. Patented July 4, 1916.

Application filed February 21, 1913. Serial No. 749,905.

To all whom it may concern:

Be it known that I, FREDERICK M. FURBER, a citizen of the United States, residing at Revere, in the county of Suffolk and State of Massachusetts, have invented certain Improvements in Grinding-Machines, of which the following description, in connection with the accompanying drawings, is a specification, like reference characters on the drawings indicating like parts in the several figures.

This invention relates in general to grinding machines, and especially, although not exclusively, to machines of this class designed to operate upon metallic surfaces. In such machines it is usually advantageous and frequently necessary to supply a fluid such as water in order to facilitate the grinding operation and prevent the metal from becoming unduly heated in the process of grinding.

The object of the present invention is to provide means for this purpose which shall be simple in construction and reliable in operation and which will deliver an adequate supply of the fluid uniformly to all portions of the active surface of the grinding member.

To this end one feature of the invention comprises means in a rotary grinder arranged to deliver a fluid upon the face of the grinding wheel in such manner that the fluid is caused to spread by centrifugal action uniformly toward all portions of the edge of the wheel, such means preferably comprising a rotary distributer arranged to receive the fluid and deliver it centrifugally to the wheel.

A further feature resides in means whereby the fluid is conveyed from a suitable source of supply, such means comprising an endless flexible carrier, such as an endless chain, arranged to convey the fluid to a convenient point for delivery to the grinding wheel.

Other and more particular features of the invention will be noted in the following detailed description and pointed out in the claims.

The invention is illustrated as applied to a grinder having a small rapidly rotating emery wheel and designed particularly for grinding the teeth of rotary cutters; but it should be understood that while the invention is of great practical utility as applied to such a machine, it is by no means limited thereto, but is of wide application to various types of machines of the general class indicated.

In the drawings; Figure 1 is a perspective view of a grinding machine embodying my invention; and Fig. 2 is a detail sectional view of the grinding wheel and the parts adjacent thereto.

In the machine illustrated the base 2 supports bearings 4 for the rotary shaft 6 upon one end of which is secured a grinding wheel 8. This wheel has a concave inner face presenting, in the form shown, a surface which slopes outwardly in a radial curve toward the periphery of the wheel, and is designed particularly for grinding the teeth of rotary cutters. Projecting from the frame of the machine is a bracket 10 provided with a spindle 12 upon which the cutter head is to be mounted while being ground. These parts are of well-known construction and require no further description.

For supplying a fluid to the grinding wheel I have provided means which includes preferably a member 14 arranged to rotate with the wheel and conveniently secured as a sleeve upon the shaft, said member having at one end a diametrical enlargement and at the other end a portion 18 frusto-conical in form and of greater diameter than said enlargement and arranged closely adjacent to the concave face of the wheel, but preferably slightly spaced therefrom, as shown, so as to permit wheels of varying thickness to be mounted on the shaft without disturbing the position of the sleeve 14. The intermediate cylindrical portion 16 of the sleeve is arranged to receive upon its surface the fluid that is supplied thereto in a manner to be described. As the shaft is rotated this fluid will flow outwardly by centrifugal action over the surface of the member 18, which acts as a distributer and delivers the fluid from its outer edge simultaneously at all sides upon the lateral surface or face of the wheel and practically at all points of a circle concentric with the wheel axis. The fluid will then flow centrifugally outward over the

sloping surface of the grinding wheel and uniformly in all directions from the axis. Since the distributer 18 is of greater diameter than the enlargement at the other end of the sleeve, the fluid will tend to flow from the cylinder 16 over the distributer rather than in the opposite direction over the enlarged end of the sleeve and will thus be utilized without waste and prevented from working back along the shaft toward the bearings.

As a means for supplying fluid to the receiving member 16 I have provided beneath the shaft a receptacle 20 for a suitable cooling fluid such as water, and an endless flexible member 22 depending from the member 16 and arranged to dip within the fluid in the receptacle. In the illustrated preferred embodiment the member 22 is in the form of an endless chain, but any suitable member of similar character may be employed. It will be understood that the chain 22 is driven continuously around the shaft by friction on the member 16 at a speed proportional to the speed of rotation of the shaft. The chain will thus convey the fluid that adheres thereto in its passage through the receptacle to the surface of the cylinder 16 where it will be taken up by the distributer 18 and delivered to the grinding wheel.

The operation of the device will be clear from the preceding description. It will be seen that the chain 22 and the distributer constitute a fluid supplying means which becomes effective immediately on starting the rotation of the grinding wheel and which provides a continuous supply of fluid, the volume of which will vary in direct proportion to the speed of rotation of the wheel. Since the fluid is delivered to the wheel constantly in equal quantities upon all sides of the axis and at equal distances from the center, it will be clear that there will be no tendency for the wheel to throw off the fluid at some portion of the circumference because of an unduly large supply at that point, but that the supply upon all portions of the grinding surface equidistant from the axis will be uniform.

While I have shown as a feature of the preferred arrangement a cylindrical member 16 upon the shaft which serves as a driving means for the chain and receives primarily the fluid conveyed by the latter, it will be understood that the chain may be otherwise arranged to convey fluid to the distributer. It will also be understood that the position of the receptacle 20 and the length and character of the member 22 may be varied according to the volume of fluid supply desired, or in view of other special considerations, and that any suitable fluid may be used with the device. Other variations also from the specific features of the illustrated preferred embodiment are comprehended in the invention as set forth in the appended claims.

Having described my invention, what I claim as new and desire to secure by Letters Patent of the United States is the following:

1. In a machine of the class described, the combination with a grinding wheel, of means for supplying a fluid to the wheel, said means being constructed and arranged to deliver the fluid upon the lateral surface of the wheel simultaneously on all sides of the wheel axis in position to flow centrifugally over said surface to the outer edge of the wheel.

2. In a machine of the class described, the combination with a grinding wheel, of means for supplying a fluid to the wheel, said means comprising a circular distributer constructed and arranged to deliver the fluid from all points on its peripheral edge upon the lateral surface of the wheel.

3. A machine of the class described having, in combination, a shaft, a grinding wheel thereon, and a rotary distributer arranged to deliver a fluid by centrifugal action upon the lateral surface of the wheel in position to flow centrifugally over said surface to the outer edge of the wheel.

4. In a machine of the class described, the combination with a shaft and a grinding wheel thereon, of a frusto-conical distributer mounted on the shaft and arranged to deliver a fluid centrifugally from all points on its peripheral edge upon the lateral surface of the grinding wheel, and means to supply fluid to said distributer.

5. A machine of the class described having, in combination, a shaft, a grinding wheel thereon formed with a concave radially curved lateral face, a fluid distributer mounted on the shaft and arranged to deliver a fluid centrifugally upon said face, and means to supply fluid to said distributer.

6. A machine of the class described having, in combination, a shaft, a grinding wheel thereon formed with a concave radially curved lateral face, a frusto-conical fluid distributer arranged to rotate adjacent to said face and spaced therefrom, said distributer having its end of larger diameter positioned within the concavity of said face and means to supply a fluid to said distributer.

7. In a machine of the class described, the combination with a shaft and a grinding wheel thereon, of a fluid receiving member mounted on said shaft means to supply a fluid to said member, and a distributer arranged to receive the fluid from said member and deliver said fluid by centrifugal action upon the lateral surface of the grinding wheel in position to flow centrif-

ugally over said surface to the periphery of the wheel.

8. In a machine of the class described, the combination with a grinding wheel, of a fluid receiving member arranged to rotate concentrically with said wheel, said member having a diametrical enlargement at one end and at the other end a distributer arranged to deliver a fluid by centrifugal action upon the grinding wheel, said distributer being of greater diameter than said enlargement, and means for supplying said fluid primarily to the intermediate portion of said member.

9. In a machine of the class described, the combination with a shaft and a grinding wheel thereon, of a receptacle for fluid, an endless flexible member driven by said shaft and arranged to convey the fluid from said receptacle, and means to deliver the fluid from said member to the grinding wheel.

10. In a machine of the class described, the combination with a shaft and a grinding wheel thereon, of a receptacle for fluid below the shaft, an endless flexible member depending from the shaft and driven thereby, said member being arranged to dip within the fluid in said receptacle and act as a carrier therefor, and means to deliver the fluid from said member to the grinding wheel.

11. In a machine of the class described, the combination with a shaft and a grinding wheel thereon, of a receptacle for fluid below the shaft, an endless chain depending from the shaft and driven thereby, said chain being arranged to dip within the fluid in said receptacle and act as a carrier therefor, and a frusto-conical distributer on the shaft arranged to receive the fluid from said chain and deliver it centrifugally to the grinding wheel.

12. A machine of the class described having, in combination, a grinding wheel formed with a concave lateral face sloping outward toward the periphery of the wheel, and a rotary distributer constructed and arranged to deliver a fluid centrifugally upon said face and having its delivery portion located within the concavity of the face.

13. In a machine of the class described, the combination with a shaft and a grinding wheel thereon, of a distributer on the shaft arranged to deliver fluid by centrifugal action upon the surface of the wheel, and an endless flexible member driven by the shaft and arranged to convey fluid to said distributer.

14. A machine of the class described having, in combination, a grinding wheel recessed at one side to provide a lateral face that slopes relatively to the axis toward the periphery of the wheel, a fluid distributer having a substantially circular outer edge within said lateral recess of the grinding wheel in position to deliver fluid upon said face uniformly around the axis of the wheel, and means for supplying fluid to said distributer.

15. A machine of the class described having, in combination, a grinding wheel recessed at one side to provide a lateral face that slopes relatively to the axis toward the periphery of the wheel, a frusto-conical fluid distributer having its end of larger diameter adjacent to said face in position to deliver fluid upon said face uniformly around the axis of the wheel, and means for supplying fluid to said distributer.

16. A machine of the class described having, in combination, a grinding wheel recessed at one side to provide a lateral face that slopes relatively to the axis toward the periphery of the wheel, a rotary fluid distributer constructed and arranged to deliver fluid by centrifugal action upon said face uniformly around the axis of the wheel, and means for supplying fluid to said distributer.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FREDERICK M. FURBER.

Witnesses:

HOWARD O. WINSLOW,

H. DORSEY SPENCER.