

F. N. & F. E. GARDNER.
A. M. GARDNER, EXECUTRIX OF F. N. GARDNER, DEC'D.
VERTICAL SPINDLE DISK GRINDER.
APPLICATION FILED APR. 3, 1911.

Patented July 6, 1915.

3 SHEETS—SHEET 1.

1,145,189.

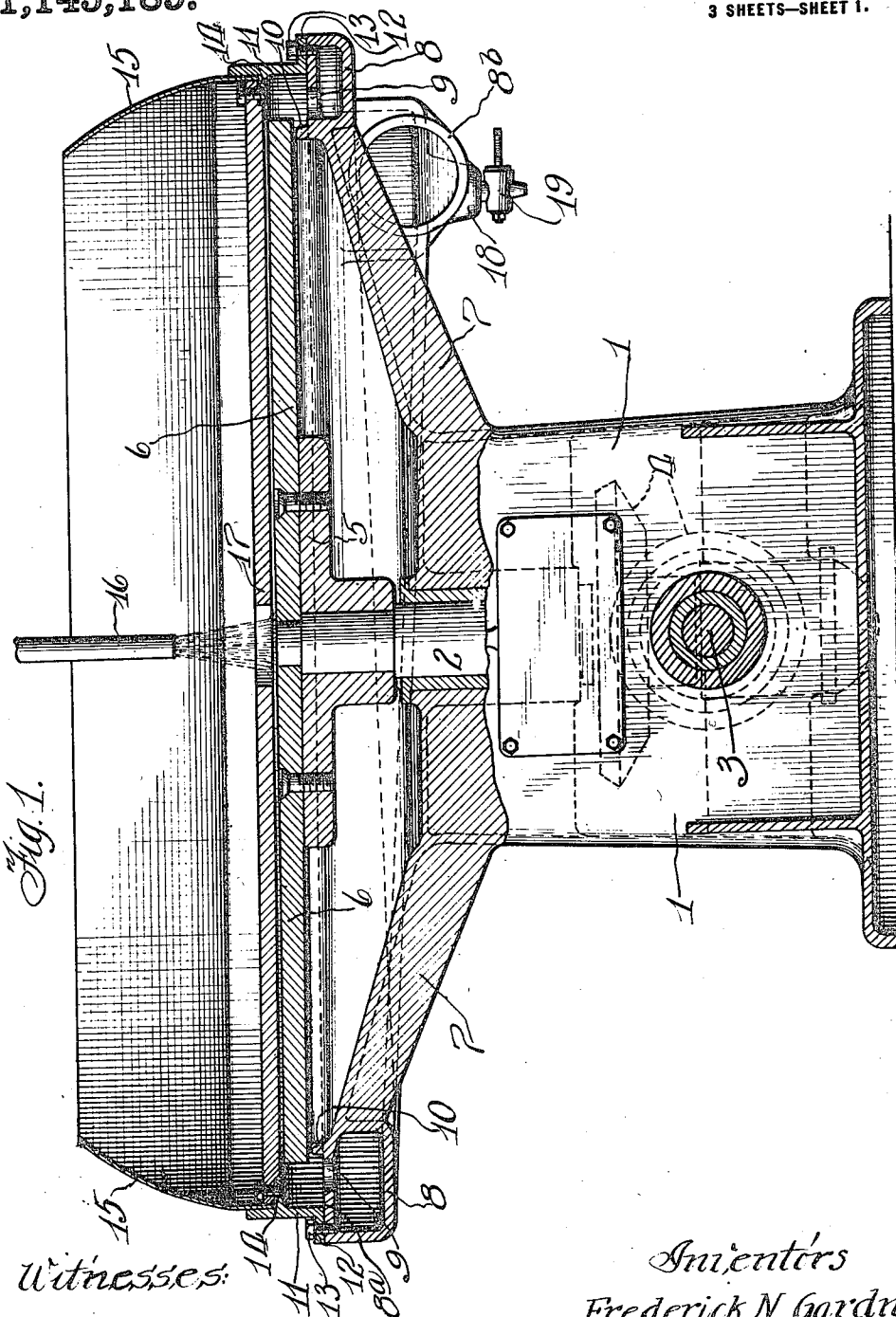


Fig. 1.

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C. Paul Parker.

Inventors

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3 SHEETS—SHEET 2.

Fig. 3.

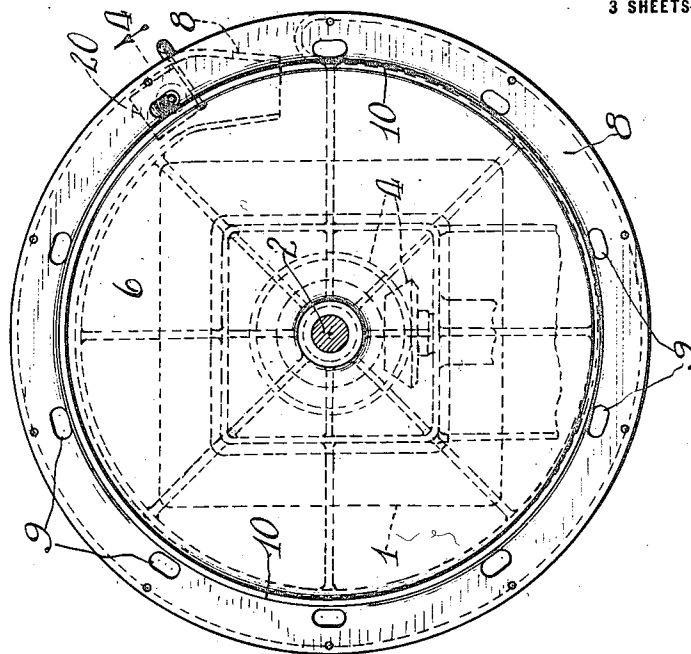
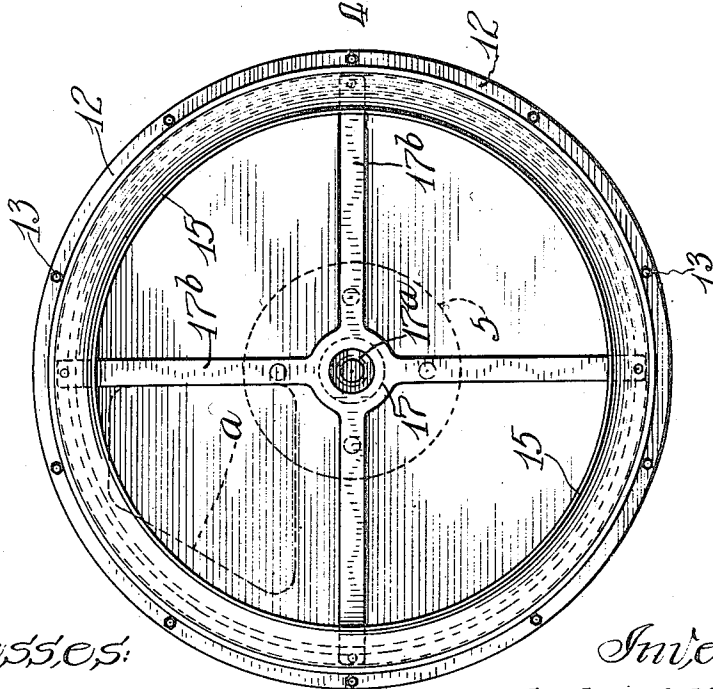


Fig. 2.



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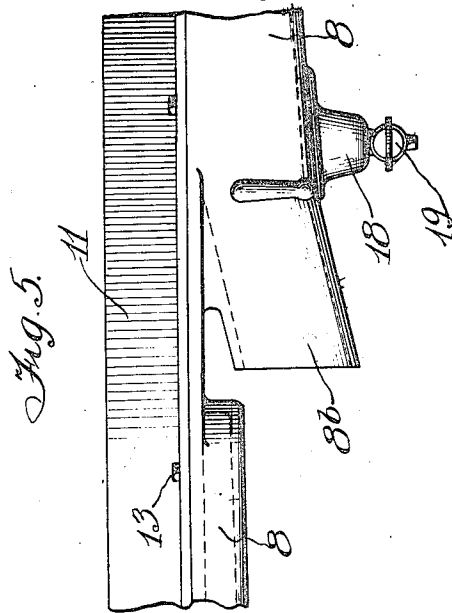
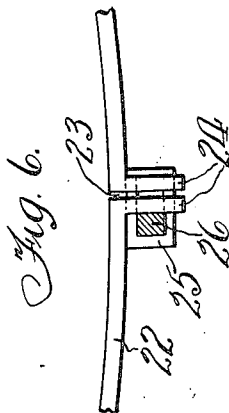


Fig. 5.



Aug. 6.

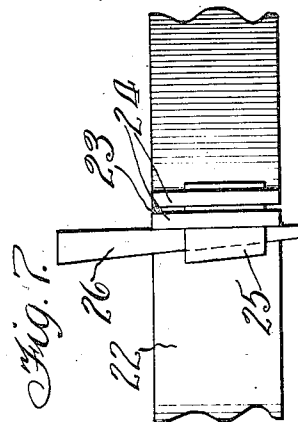


Fig. 7.

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UNITED STATES PATENT OFFICE.

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VERTICAL-SPINDLE DISK GRINDER.

1,145,189.

Specification of Letters Patent.

Patented July 6, 1915.

Application filed April 3, 1911. Serial No. 618,710.

all whom it may concern:

Be it known that we, FREDERICK N. GARDNER and FREDERIC E. GARDNER, citizens of the United States, residing at Beloit, in the county of Rock and State of Wisconsin, have invented certain new and useful Improvements in Vertical-Spindle Disk Grinders, of which the following is a specification.

This invention relates to disk grinders of the type embodying a vertical spindle having a horizontal disk wheel fixed upon its upper end, and an abrasive disk or coating secured to the face of said wheel.

The present invention contemplates a means for flooding the grinding wheel with water during the grinding operation.

Another object of the invention is the provision in a disk grinder of means for conducting a suction draft of air to draw away the dust from the grinding wheel when the machine is being used in dry grinding, and for conducting away the water supplied when doing wet-grinding.

In the accompanying drawings, Figure 1 is a vertical sectional view taken partially in the vertical plane of the spindle, and illustrating a disk grinder embodying the features of our invention. Fig. 2 is a plan view of the parts shown in Fig. 1. Fig. 3 is a view similar to Fig. 2 with the water hood and its retaining ring, the work holder and the disk wheel removed. Fig. 4 is a fragmentary vertical section taken on line 4-4 of Fig. 3 and showing the means for retaining a quantity of hot water upon the face of the grind-wheel. Fig. 5 is a fragmental side elevation of the parts shown in Fig. 4. Fig. 6 is a fragmental plan view and Fig. 7 is a fragmental side elevation of a modified form of hot water retaining band.

The form of machine herein shown comprises a suitable base 1 having a vertical spindle 2 rotatably mounted therein, said spindle being driven by means of a horizontal rotary shaft 3, and intermeshing bevel gears 4 upon said shaft and said spindle. Upon the upper end of the spindle 2 is fixed a flange 5 to which is secured the grinding wheel 6. If dry grinding is to be done, the abrasive disk (not shown) may be secured by suitable adhesive material to the upper face of the wheel 6. When the grinding wheel is to be flooded with water

as hereinafter explained, a waterproof abrasive face must be used. Such a surface may be provided, for example, by covering the face of the disk with soft material such as lead and facing the lead coating with grains of abrading material.

At the upper end of the base 1 is an annular web or flange 7 and at the outer end of said web is formed, in this instance integral with the web, a trough or conductor 8 of spiral or gradually tapering form. The top of the trough 8 is closed as shown and has a plurality of openings 9 therein adapted to admit water or air, as the case may be, depending on whether wet or dry grinding is being done. One end of the conductor is closed and the opposite end is adapted for attachment to a suction fan, so that in dry grinding dust may be drawn from adjacent the face of the wheel through the openings 9 and into the conductor 8. An annular rib 10 which extends close to the underside of the wheel 6 near its periphery cuts off the flow of air which would otherwise pass from beneath the wheel 6 and into the conductor 8.

A rim 11 is secured to the upper side of the trough 8, said rim having an annular flange 12 resting upon the top wall 8^a of the trough and being secured thereto by means such as cap screws 13 passing through said flange and into said top wall. On the inner periphery of the rim 11 is an annular horizontal flange 14 which is positioned only a slight distance above the upper face of the grinding wheel 6. Removably seated upon the flange 14 and fitting within the rim 11 is an annular wall or open hood 15. Water is conducted to the upper face of the grinding wheel through a downwardly extending pipe 16, the lower discharge end of which is arranged adjacent to and centrally of the wheel. The hood 15 protects the operator from the water thrown outwardly by the rotary wheel 6.

If desired, a work holder 17 may be provided, said holder in this instance comprising a central portion having an opening therein 17^a through which water from the pipe 16 flows and having a plurality of radial arms 17^b, the outer ends of which are secured to the annular flange 14 upon the rim 11. A piece of work *a* (indicated in dotted lines in Fig. 2) which is laid upon

the grinding wheel, is held by one of the radial arms 17^b against movement with the wheel. Ordinarily the work is heavy enough to be held by gravity in good contact with the wheel. If the work is light, a suitable weight may be placed thereon.

The water coming from the pipe 16 escapes through the openings 9 in the upper wall of the trough or conductor 8, the water flowing around said trough and discharging from its lowermost or outlet portions 8^b. If desired the water may be caught in a tank and pumped back to the pipe 16. It will be understood that a suitable pipe-and-valve arrangement (not shown) may be provided so that an air suction means and a water outlet pipe may be alternately placed in communication with the outlet 8^b of the trough 8, in order that the machine may readily be adapted for dry or wet grinding as desired.

When one of the abrasive disks used in dry grinding has become worn so as to necessitate its removal, a band 21 which is preferably tapering, is fitted upon the periphery of the wheel 6 so as to form a fluid-tight contact with said wheel, the upper edge of the band projecting above the upper face of the wheel a sufficient distance to hold a quantity of hot water upon said upper face of the wheel. The hot water melts the cement or other adhesive material which holds the abrasive disk to the wheel 6 so that said disk may be readily removed from the wheel. The wheel itself is also uniformly and mildly heated by the water so that the preparation of the wheel for refacing is greatly facilitated. When the band 21 is removed from the wheel the water escapes into the trough 8 and flows to its lower portion and into a cup 18 formed in the bottom wall of the trough. A suitable drainage cock 19 controls the escape of the water from the cup 18, said cock being closed except when hot water used in removing an abrasive disk is being drained from the machine. If desired, a pivoted cover 20 may be provided to cover the cup 18 when it is not in use.

In Figs. 6 and 7 we have shown a modified construction of water-retaining band, the form therein shown comprising a straight band 22 adapted to be clamped upon the periphery of the wheel 6. The band 22 has a slit 23 therethrough and ears 24 adjacent said slit adapted to be drawn together by suitable means such as a link 25 and a wedge 26 so as to form a fluid-tight contact between the band and the wheel.

When dry grinding is to be done, the water hood 15 may be removed from the machine and the discharge end 8^b of the conductor 8 placed in communication with the suction system so as to create a current of air toward the conductor at the periph-

ery of the wheel 6, such current of air carrying with it the dust caused in the grinding operation.

The foregoing description has been made quite detailed for the sake of clearness, but without intending to limit the invention to the exact form herein shown.

We claim as our invention:

1. In a vertical spindle disk grinder, in combination, a base; a vertical spindle rotatably mounted therein; a disk wheel fixed on the upper end of said spindle; and a tube carried at the upper end of said base and running in a circle beneath the periphery of said disk wheel, said tube having a plurality of inlet openings in its top wall, and having its bottom wall spirally disposed.

2. In a vertical spindle disk grinding machine, in combination, a base, a vertical spindle rotatable therein, a disk wheel fixed upon the upper end of said spindle, an annular web upon the upper portion of said base and a spiral trough carried at the outer edge of said web and underlying the periphery of said wheel, a rim fixed to said trough and an annular wall carried by said rim, and means for supplying water to said wheel.

3. In a vertical spindle disk grinder in combination, a base, a vertical spindle rotatable therein, a horizontal wheel fixed upon the upper end of said spindle, an annular web upon the upper end of said base, a conductor carried at the periphery of said web and underlying the periphery of said wheel, an annular rim fixed to said conductor, an annular wall mounted upon said rim and surrounding said wheel, a work holder having radial arms fixed to said rim and lying adjacent to the face of said wheel, and means for supplying water to said wheel.

4. In a vertical spindle disk grinder in combination, a base, a vertical spindle rotatable therein, a disk wheel fixed upon the upper end of said spindle, an annular conductor carried by the upper end of said base and underlying the periphery of said wheel, said conductor having a spiral bottom wall and having one or more openings in its top wall, the discharge end of said conductor being adapted for attachment to a suction means, a cup in the bottom wall of said conductor adjacent its discharge end, means for controlling the flow of fluid from said cup, annular wall means secured upon the upper wall of said conductor, and means for supplying water to the face of said wheel.

5. In a vertical spindle disk grinder in combination, a base, a vertical spindle rotatable therein, a disk wheel fixed upon the upper end of said spindle, an annular web at the upper portion of said base, a conductor integral with the edge of said web and underlying the periphery of said wheel, said conductor having a sloping bottom wall and having one or more openings in its top wall, the

discharge end of said conductor being adapted for attachment to a suction device, an annular rim secured to the upper wall of said conductor, an annular wall fitting upon said
5 rim and surrounding said disk wheel, and means for supplying water to the face of said wheel.

In testimony whereof we affix our signatures in presence of two witnesses.

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FREDERIC E. GARDNER.

Witnesses:

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H. M. ADAMS.