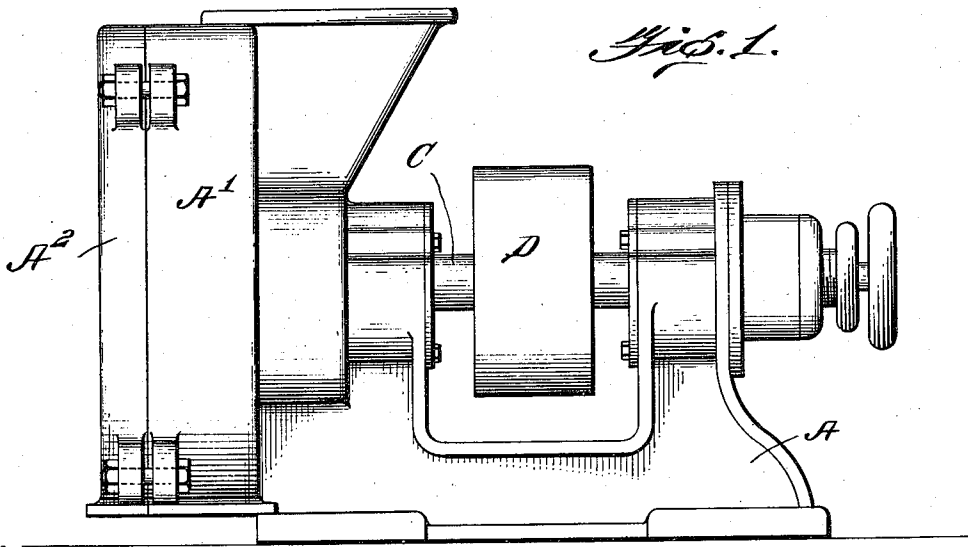
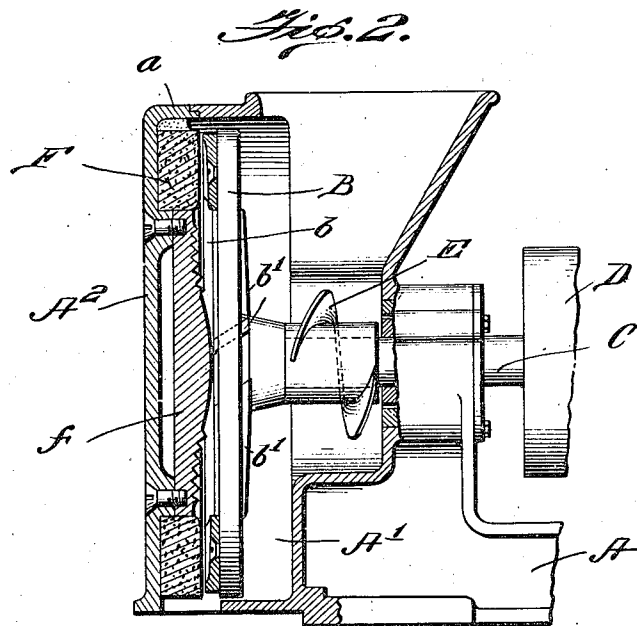


L. C. WINEGARDNER.
MIDDLINGS MILL OR GRINDER.
APPLICATION FILED JUNE 28, 1918.

1,286,865.

Patented Dec. 3, 1918.
2 SHEETS—SHEET 1.



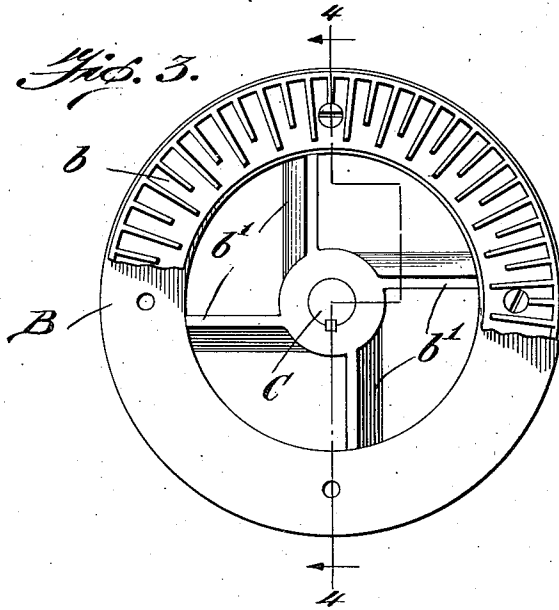
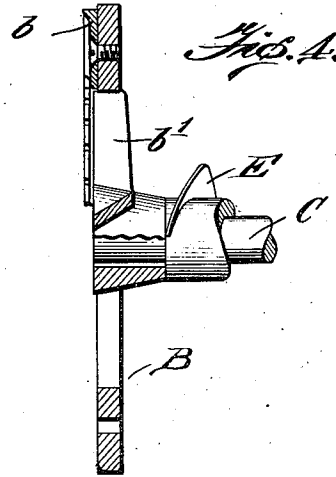
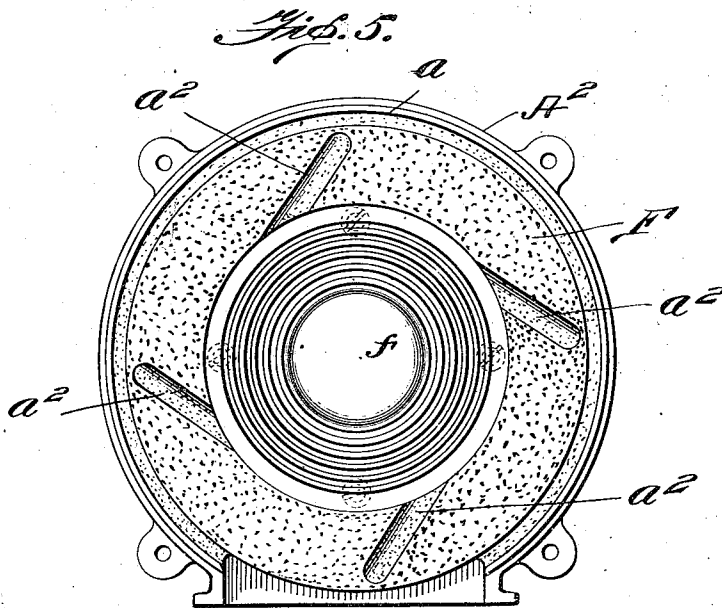
Witnesses
B. M. Offutt
By Joseph

Inventor,
Lloyd C. Winegardner
By William C. Howell
his Attorney.

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Lloyd C. Winegardner
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UNITED STATES PATENT OFFICE.

LLOYD C. WINEGARDNER, OF MUNCY, PENNSYLVANIA, ASSIGNOR TO SPROUT, WALDRON & COMPANY, OF MUNCY, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

MIDDLINGS MILL OR GRINDER.

1,286,865.

Specification of Letters Patent.

Patented Dec. 3, 1918.

Application filed June 28, 1918. Serial No. 242,444.

To all whom it may concern:

Be it known that I, LLOYD C. WINEGARDNER, a citizen of the United States, residing at Muncy, in the county of Lycoming and State of Pennsylvania, have invented certain new and useful Improvements in Middlings Mills or Grinders; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to grinding mills and more particularly to mills of the disk action type for grinding grain.

The primary object of the invention is to provide an improved middlings mill or grinder for use in reducing, granulating or disintegrating middlings after the first reduction by the use of rolls as now employed in flour mills, whereby a better and more economical finish and a larger yield of flour may be obtained than is possible in the production of flour according to present methods.

The invention will first be hereinafter more particularly described, with reference to the accompanying drawings, which form a part of this specification, and then pointed out in the claims at the end of the description.

In said drawings:—

Figure 1 is a side elevation of a grinding mill embodying my invention;

Fig. 2 is a vertical sectional view of a portion of the mill shown in Fig. 1, parts thereof being broken away;

Fig. 3 is a side view of the rotating runner head;

Fig. 4 is a vertical sectional view taken on the line 4—4 of Fig. 3, looking in the direction of the arrows; and,

Fig. 5 is a side elevation of the stationary head or bur.

Referring to said drawings, in which the same reference letters are used to denote corresponding parts in different views, the letter A may denote the machine frame of my improved grinding mill having a casing A¹, at one end inclosing a revolving runner head B, which is mounted on a shaft C, having a driving pulley D thereon; said shaft being preferably journaled in ball bearings (not shown), and provided with means such as are ordinarily employed in this class of machines for controlling and adjusting the

runner head. The runner head B, has attached thereto a grinding plate or plates *b*, which may consist of a solid annular plate or plates of hardened metal or steel such as are ordinarily employed in grinding mills of the same type surrounding the eye of the runner head, said plate having a grinding surface with radial grooves or ribs thereon adapting it to exert a rubbing rather than a cutting action and to turn over and break up the flaky and fibrous particles as they are carried along the corundum-like grinding surface of the adjacent stationary head. A plurality of arms *b*¹, in this instance four, extend radially from and connect the hub of the head with the annular or peripheral portion thereof, said arms having flattened sides arranged at an angle to the axis of the head, so as to prevent inclined working faces adapted to gather in the material while revolving and cause it to enter evenly between the grinding surfaces and to break up any large lumps by rubbing and crushing them against the center of the adjacent head or grinding disk. Adjacent the hub of the revolving head I preferably provide a spiral blade or screw E, on the shaft C, to assist in feeding the material to the grinding disks. The stationary head or bur F, is preferably constructed with a central portion or circular plate *f* of hardened corrugated metal or steel to provide a furrowed surface over which the material being reduced must pass before it enters between the grinding surfaces of the heads; the corrugations or furrows being preferably concentric with the axis of the head. The corrugations in cooperation with the inclined arms on the rotating head serve to reduce the larger lumps of grain to a suitable size for passing between the grinding surfaces of the heads and assist materially in the rapid and thorough reduction of the grain. Said central portion, however, may be smooth when grinding fine stock. The said corrugated plate *f* may be secured to a removable member A², of the casing by set screws or otherwise, as shown in Fig. 2 of the drawings, and the annular recess between the corrugated plate and an inwardly projecting flange *a* on the periphery of the casing member A², surrounding the corrugated plate is provided with a filling of emery cement composition, corundum, or corundum-like material, to provide an ex-

cessively hard grinding surface facing a radially ribbed or grooved grinding surface of hardened metal on the revolving head. I have discovered that there is a peculiar action produced by the hardened metal or steel grinding plate in cooperation with the adjacent grinding surface of emery cement composition or corundum on the stationary head that enables the mill to grind into flour the tough fibrous middlings that heretofore have gone into feed, thus giving a larger yield of flour per bushel than it has heretofore been possible to obtain and obviating the excessive frictional heat incident to using grinding heads as heretofore ordinarily constructed. While specially designed and adapted to grind middlings after the first reduction on smooth rolls, the mill can be advantageously employed in grinding whole wheat at one operation into perfectly fine flour or in finishing the feed. To facilitate the entrance of the material between the grinding surfaces, a series of grooves or furrows a^2 are provided in the filling of emery cement composition, and which terminate short of the periphery of the head, being preferably arranged tangentially to the outer corrugation of the central plate as shown in Fig. 5 of the drawings, so that the material must be reduced to a proper degree of fineness before it can enter between the grinding surfaces of the rotating and stationary heads and fall into the discharge at the bottom or lower side of said heads.

The described combination of revolving head with hardened metal plate and opposed stationary bur with corundum grinding surface is designed and adapted to exert a rubbing rather than a cutting action, and especially in the reduction of middlings or wheat already partly reduced by running through rolls and left in a flattened out and flaky condition, so that the material will not pass through the meshes of the silk or wire on which it is to be bolted, but by passing it through this machine, it is subjected to a rubbing action, thus rounding up the material and putting it into condition to pass through the silk. It will be understood, of course, that various kinds of materials may be employed to provide a stationary head having the desired grinding surface of corundum or the like, and in using the word corundum in the appended claims, I do not desire to be limited to such material but to include any suitable and equivalent composition adapted to produce an excessively hard abrasive or grinding surface. The mill may also be provided with two or more interchangeable stationary heads to adapt it to different kinds of work, such as grinding bran, whole wheat flour, middlings or cereals, reducing the same to fine flour at one operation, with the greatest possible economy of power and operating expense. Hardened

metal grinding plates of various constructions may also be employed for attachment to the revolving heads and while a solid circular plate is desirable for use in mills of small size, a plurality of grinding plates or quadrants may be used and are preferable for the larger mills, being readily removable and interchangeable so that they may be easily replaced when worn or a different plate substituted for grinding different materials.

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

1. In a grinding mill, the combination with a runner head having a grinding surface of hardened metal with radial ribs thereon, of a stationary head having a grinding surface of corundum-like material.

2. In a grinding mill, a stationary runner head comprising an annular body having a centrally disposed plate of corrugated metal and a surrounding grinding surface of corundum-like material, in combination with a revolving head having a radially ribbed grinding surface of hardened metal confronting said corundum-like surface, said surface having inclined grooves therein extending from the outermost corrugation and terminating short of the periphery of the head.

3. In a grinding mill, a stationary head having an annular grinding surface of excessively hard abrasive material, and a central circular corrugated plate; said grinding surface having grooves therein extending tangentially to the outermost of said corrugations and terminating short of the periphery of said grinding surface.

4. In a grinding mill, a stationary bur comprising a centrally disposed corrugated metal plate, an annular body encircling said plate and having a grinding surface of corundum-like material, said surface having furrows therein arranged tangentially to the outermost of said corrugations and terminating short of the periphery of said grinding surface.

5. In combination, a stationary bur having a centrally disposed corrugated plate and an annular body encircling said plate and having a grinding surface of corundum-like material, said surface having furrows therein which extend tangentially from the outermost of said corrugations and terminate short of the periphery of said grinding surface, and a revoluble runner head having a grinding plate thereon of hardened metal facing the grinding surface of said stationary head, and also having radially disposed arms with flattened sides arranged at an angle to its axis and connecting its annular body and hub for cooperation with said corrugated plate in crushing material therebetween.



6. The combination in a grinding mill of a pair of millstones having confronting grinding surfaces, one of hardened metal and the other of corundum-like material; said metal surface having an annular series of radially disposed ribs thereon facing said corundum-like grinding surface.

7. In a grinding mill, a stationary head comprising an annular body having on one side thereof a grinding surface of corundum-like material, and a centrally disposed smooth-surfaced corrugated plate; said corundum-like surface having grooves therein extending laterally thereof.

8. In a grinding mill a grinding head comprising a centrally disposed metal plate having a series of substantially concentric grooves or corrugations therein and an annular body surrounding said plate and having a grinding surface of corundum-like

material, said surface having grooves therein extending substantially tangentially to said corrugations.

9. In combination, a stationary head having a grinding surface of corundum-like material, said surface having furrows therein which extend laterally thereof, and a rotating head having a grinding surface of hardened metal constructed with an annular series of radially disposed ribs facing the corundum-like surface of said stationary head; said ribs being adapted to carry or move the material under treatment along said corundum-like grinding surface.

In testimony whereof I affix my signature in the presence of two witnesses.

LLOYD C. WINEGARDNER.

Witnesses:

STEPHEN SOURS,
J. RUSSELL SMITH.