

(No Model.)

2 Sheets—Sheet 1.

T. L. STURTEVANT.
MILLSTONE.

No. 550,301.

Patented Nov. 26, 1895.

Fig. 1.

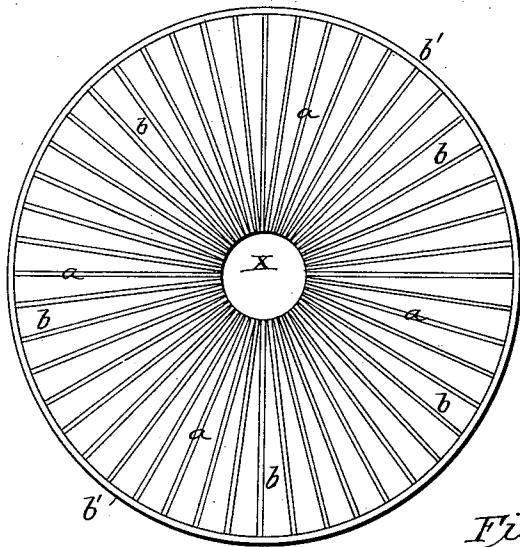


Fig. 2.

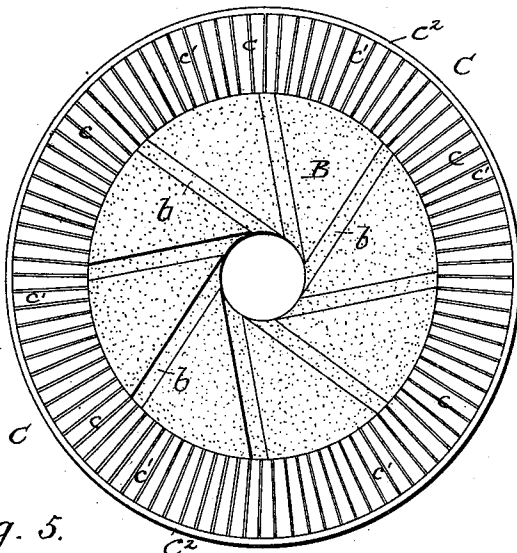


Fig. 3.

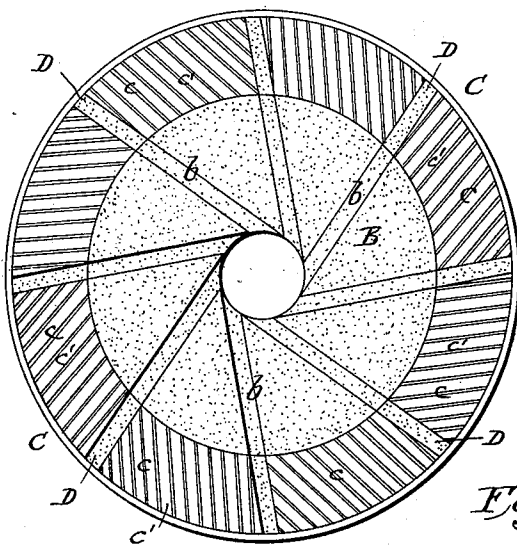


Fig. 5.

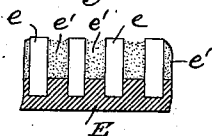


Fig. 4.

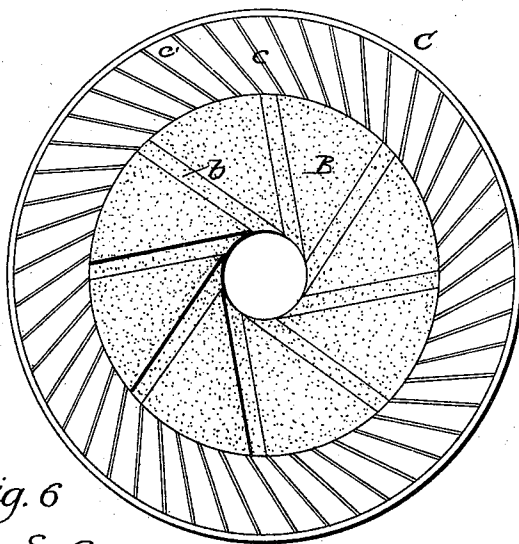
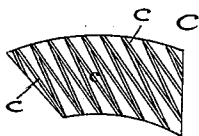


Fig. 6.



Witnesses:

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Inventor.

Thomas L. Sturtevant
by his attorneys

Paulson, Davidson & Wight

(No Model.)

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Fig. 7.

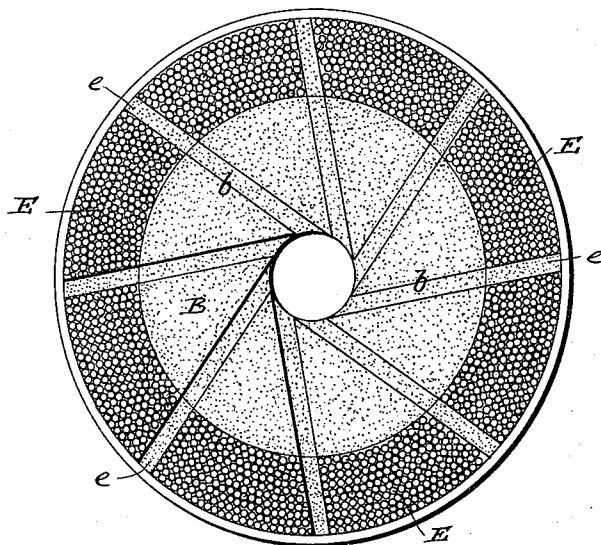


Fig. 8.

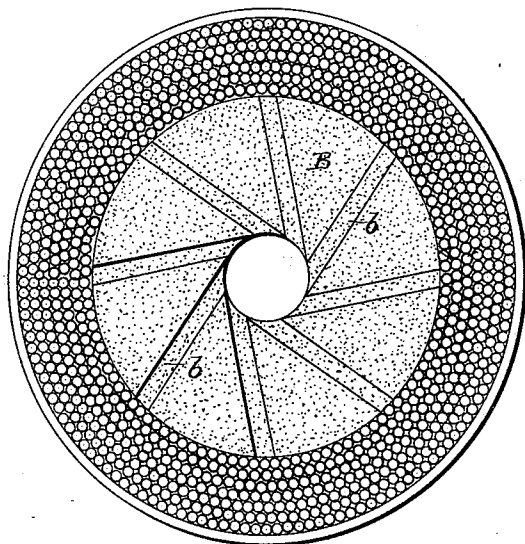
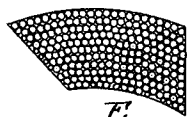


Fig. 9



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UNITED STATES PATENT OFFICE.

THOMAS LEGGETT STURTEVANT, OF QUINCY, MASSACHUSETTS.

MILLSTONE.

SPECIFICATION forming part of Letters Patent No. 550,301, dated November 26, 1895.

Application filed January 24, 1894. Serial No. 497,899. (No model.)

To all whom it may concern:

Be it known that I, THOMAS LEGGETT STURTEVANT, a citizen of the United States, residing at Quincy, in the county of Norfolk and State of Massachusetts, have invented certain new and useful Improvements in Millstones, of which the following is a specification.

My present invention relates to composite millstones, or those in which a hard grinding material is combined with a softer binding material or filling.

In Letters Patent heretofore granted to me I have shown composite millstones in which a stone-eye is surrounded by a skirt made up of lumps of hard material, such as emery, embedded in binding or filling material, such as metal. I have also shown in these patents furrow-strips extending from the eye to the periphery of the stone and interposed between the skirt-sections.

For some classes of work I find that the lumps of emery may be replaced by plates, blocks, or sections of hard material, such as steel.

I am aware that heretofore it has been proposed to construct a millstone of plates or slabs of iron or steel and to fill in between the plates with softer material, such as wood or paper. I am also aware that it has been proposed to construct a millstone by casting the body with grooves or openings and subsequently running or pouring molten metal into said grooves or cavities, thereby producing a grinder having a cast-metal body with chilled sections or strips of metal secured therein; but in none of these millstones has there been provision made for causing the wear at the eye to coincide with the wear on the skirt, to insure the proper dressing of the stone.

I have found it important to make the bosom of a material softer than that of the skirt, because, as the skirt traverses a greater distance in a given time than the bosom it does more work, and would wear more quickly unless it were made harder to resist this wear. Unless provision is made to cause the bosom to wear equally as fast as the skirt it would

soon become "high" and require frequent dressing.

According to my invention, I form the skirt of hard material, such as steel, and fill in between the plates with softer material, such as a soft molten metal—for instance, zinc, tin, or spelter—or a cement or mortar is used which may contain in its composition sand or gritty emery.

The bosom is formed of stone, which, while softer than the metal plates of which the skirt is formed, is sufficiently hard and durable, and may be readily dressed by suitable tools. The bosom may be formed with furrows or grooves, and the skirt is preferably provided with furrow-strips separating the skirt into sections and forming furrows for the discharge of the ground material.

I may substitute for the metal plates wires, pins or bars set edgewise in contact with each other, and having the space between them filled in with a softer binding material.

My invention involves, in addition to the features above described, details of construction which are hereinafter described or indicated.

In the accompanying drawings, Figure 1 is a plan view of a millstone constructed, in accordance with my invention, of plates of hard material extending from center to circumference, with a suitable filling of softer material. Fig. 2 is a plan view of a millstone in which a stone bosom is surrounded by radially-arranged metal plates, separated by a filling. Fig. 3 is a plan view of a millstone in which the skirt is composed of plates arranged tangentially with reference to the center of the stone-bosom and in which furrow-strips are arranged at intervals between the sections of the skirt. Fig. 4 is a view of a similar stone where the furrow-strips are omitted. Fig. 5 is a detail view of a modification in which the plates, pins, or bars have their inner ends cast in a backing and have their ends above the backing surrounded by a filling of comparatively soft material. Fig. 6 is a detail view of a section of a skirt in which the plates are in contact with each other at their ends and have fillings between to hold them in place. Fig. 7

is a plan view of a millstone in which the skirt is composed of wires set endwise with furrow-strips between sections of the skirt. Fig. 8 is a plan view of a similar millstone with the furrow-strips omitted, and Fig. 9 is a detailed view of a section of the skirt of the millstone shown in Fig. 7.

While the form of millstone shown in Fig. 1 is not deemed by me the most efficient form, still it is believed to be within the scope of my invention, and is claimed as part thereof. In this case the plates *a* extend from the central opening *x* to the periphery of the stone. The filling *b* is of soft metal or cement, of the kind above designated, and the hoop or band *b'* binds the parts firmly together.

In Fig. 2 a stone-bosom B is shown as provided with tangentially-arranged furrows *b*, extending from the central opening to the periphery of the bosom. The skirt C is composed of radially-arranged plates *c*, separated by fillings *c'*. A hoop or band *c''* binds the skirt to the bosom.

In Fig. 3 the bosom is of the same form as that shown in Fig. 2. In the skirt, however, the plates *c* are arranged tangentially, as are also the fillings *c'*, and furrow-strips D are employed and arranged between the segmental sections of the skirt. By this arrangement of the grinding-plates tangentially a better grinding-surface is obtained, and by employing furrow-strips furrows may be formed coinciding with the furrows of the bosom to facilitate the discharge of the ground material. My invention, however, is not limited to the use of such furrow-strips, and in Fig. 4 I have shown an arrangement similar to that shown in Fig. 3, but with the furrow-strips omitted. In the construction of this class of millstones I find that it is often desirable to unite the plates in a backing. In carrying out this part of my invention I may form the stone in the manner indicated in Fig. 5, where E is the backing, *e* the grinding-plates, blocks, or bars, and *e'* the filling. The plates *e* are secured to the backing E by being cast therein or by having the backing cast onto their ends, the cement or filling being subsequently, or after the backing has cooled, placed between the plates.

A further modification is shown in Fig. 6, in which, as indicated, each section of the skirt is formed of plates *c* in contact with each other at their opposite ends, the space between the plates being filled in with the material above indicated. By this construction the plates brace each other and some of the strain is taken from the filling.

The plates in all cases are set edgewise or nearly edgewise, being either perpendicular with reference to the face of the stone or slightly inclined thereto, by which latter arrangement a sharper edge is presented and provision is made for always presenting a

sharp cutting or grinding edge as the stone wears away.

As before stated, I may employ wires, pins, or bars, set endwise to form the skirt. I have illustrated how a millstone may be constructed in this way in Figs. 7, 8, and 9.

The bosom B should be made of stone and formed with furrows or grooves *b*, arranged tangentially. The skirt is made in sections E, separated by furrow-strips *e*, preferably of stone, and arranged parallel and in line with the furrow-grooves of the bosom. The sections E are formed of wires set endwise parallel with each other and in direct contact with each other, the spaces between the numerous wires being filled in with metal or cement. Preferably very hard steel wires are employed, the cement or metal employed being of course softer than the wires. The size or gage of the wire is not of much importance. Instead of relatively small wires, as shown in Fig. 7, wire of larger gage may be used, as indicated in Fig. 8, and sometimes rods of short length may be employed.

When the skirt is formed of wires or pins, as above described, in contact with each other, and with the spaces filled in with soft material, a "honey-combed face," so much desired by millers, is produced. It is important that the filling should be softer than the pins or wires, in order that the ends of the wires may be sufficiently prominent to afford a grinding-surface.

In each instance, it will be observed, whether the skirt is composed of plates or of wires or pins, a hoop or band is employed to bind the parts together.

While I am aware, as before stated, that attempts have been made to produce a millstone in which steel plates set edgewise have been employed, I am not aware of any case in which provision has been made for equalizing the wear on the eye and the skirt and for affording an efficient grinding-surface in the skirt by employing plates, pins, or sections of such relative hardness, with reference to the eye, that the wear of the skirt will correspond with the wear at the eye.

I claim as my invention—

1. A millstone comprising a bosom of stone or equivalent relatively soft material and a skirt formed of plates of hard metal more durable than the material of the bosom, with a filling of softer material between the plates which securely binds the plates together, substantially as described.

2. A millstone comprising a skirt formed of plates of hard metal set edgewise or endwise, and a relatively soft filling, and a bosom of material softer than the material of the plates or blocks forming the grinding surface of the skirt, but harder than the filling.

3. A millstone having a grinding surface composed of plates of hard metal with a back-

ing secured to their ends by being cast thereon, and a filling of relatively soft materials, such as cement, arranged between the plates.

tively soft material arranged between the plates.

In testimony whereof I have hereunto subscribed my name.

THOMAS LEGGETT STURTEVANT.

Witnesses:

W. H. ELLIS,

T. J. STURTEVANT.

5 4. A mill stone having a grinding surface formed of plates set edgewise, the vertical edges at opposite ends of the plates being in contact with each other, and a filling of rela-