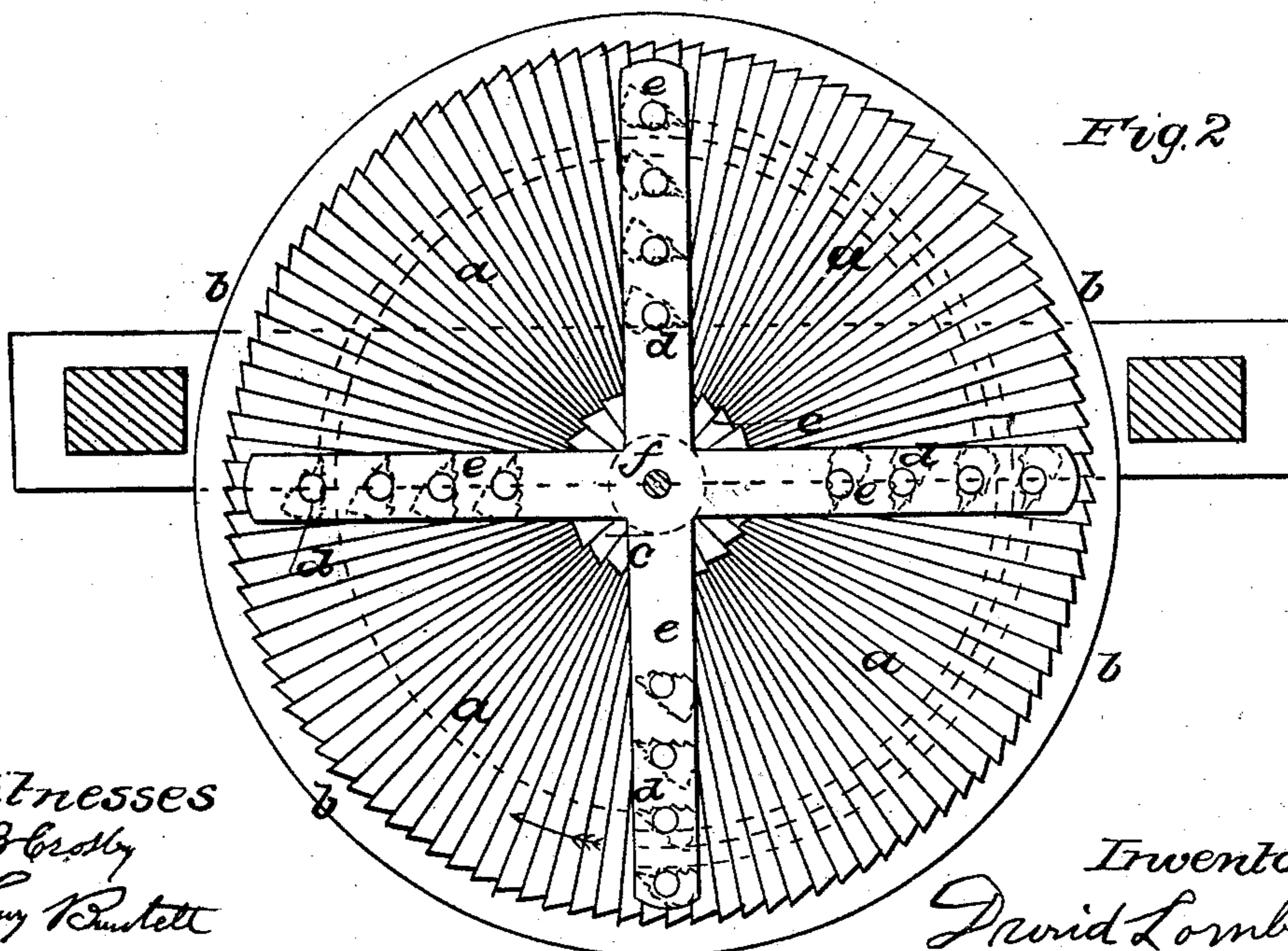
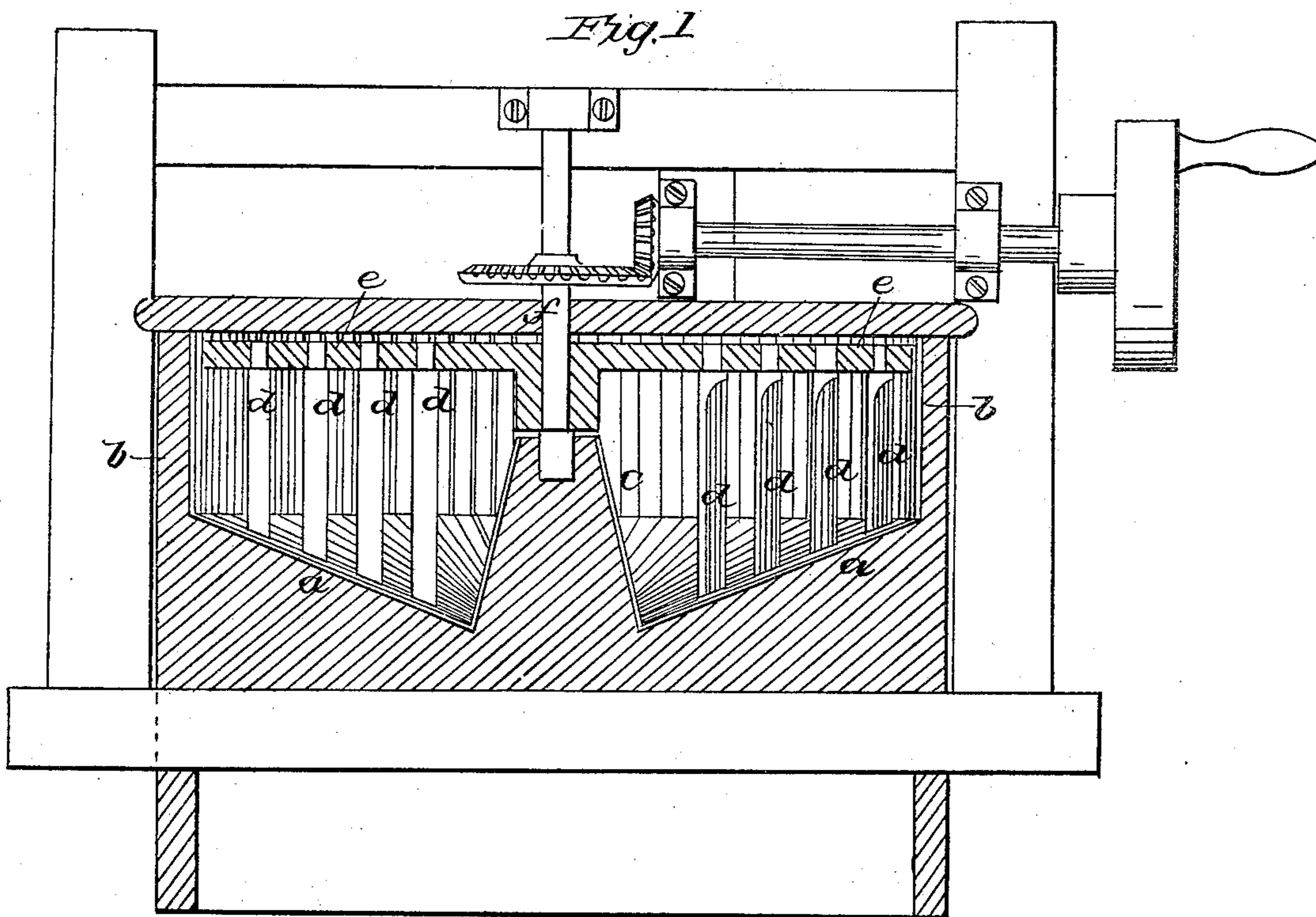


D. LOMBARD.
Rice Scouring Machine.

No. 29,894.

Patented Sept. 4, 1860.



Witnesses
J. B. Crosby
Henry Rustett

Inventor
David Lombard

UNITED STATES PATENT OFFICE.

DANIEL LOMBARD, OF BOSTON, MASSACHUSETTS.

MACHINE FOR SCOURING RICE.

Specification of Letters Patent No. 29,894, dated September 4, 1860.

To all whom it may concern:

Be it known that I, DANIEL LOMBARD, of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Machine for Scouring Rice; and I do hereby declare that the following, taken in connection with the accompanying drawings, which form a part of this specification, is a description thereof so full and exact as to enable those skilled in the art to practice my invention.

The object of my invention is the removal of the colored skin, or inner cuticle, from the grains, after the shell or husk has been separated therefrom. This is best done by generating a small amount of heat among the grains to cause them to swell slightly, and split the cuticle, which is then removed by the friction and motion of the grains. This object has been heretofore accomplished by movement of or among the grains, as in the pestle and mortar machines.

The nature, then, of my invention, consists in the peculiar form, arrangement and combination of parts by which I am enabled to accomplish the above mentioned object, in a more rapid and thorough manner than has heretofore been done.

My invention is embodied in stirrers of peculiar form and arrangement, rotating in a tub of peculiar form. This tub has a conoidal bottom, with its greatest depression toward its center. Its sides rise from the outer and raised edge of the conical or concave bottom, parallel with or converging toward the axis of the tub. In the center of the tub is located a conical piece with its base upon the bottom of the tub; this forms a step for, or surrounds, the shaft which rotates the stirrers. The surfaces inclosing the space in which the stirrers revolve, are serrated or grooved shallowly, to afford sharp edges, and a roughened or corrugated surface, against which the grains may impinge, to break and rub off their cuticle and which by opposing their motion in the direction of the stirrers, adds to friction to generate sufficient heat. These grooves should be in depth of about the transverse diameter of a grain of rice, and should be formed as is usual for the teeth of a ratchet, with their upright and radial faces presented against the direction of rotation of the stirrers. These are made fast to and pendent from arms, which are fixed to the rotating shaft, so that each stirrer shall divide in its move-

ment, the space between the paths of the pair upon the arm, immediately preceding it, and one of the stirrers should be located so near to the central cone, that the grains in contact therewith will fall into the path of the first stirrer, it being observed however, that none of the stirrers should be located so near to the surfaces of the tub, as to catch and crush the grains. The section of the stirrers and their arrangement should be such as to present edges to the rice in advancing through it, and surfaces nearest the outer boundary of the tub, inclining from a tangent to that surface inward toward the center of rotation, in the direction of the advance of the stirrers. The best form for the stirrers is triangular, and their described acting surfaces, and those which with them, form the advanced angle before mentioned should be serrated like the acting surfaces of the tub for the same reasons.

The tub being nearly filled with rice, from which the husks have been stripped, though they had best remain mingled in the mass, and the stirrers put in rotation, the operation is as follows: The inclined acting faces of the stirrers, operate to throw the grains from the center outward, to a much greater extent than the centrifugal force resulting from the rotation of the grains alone would do. The grains are forced up the inclined bottom, and among themselves against the roughened surface of the outer boundary of the tub, and coming into contact also, with the roughened surface of the stirrers. In doing this, the comparatively level surface of the rice is changed into a conical one, similar to that of the tub bottom, but of a greater or less amount of concavity, corresponding to the velocity of the rotation. It will be obvious that the rice is prevented from gravitating to a level surface by centrifugal force, and the action due to the form and position of the stirrers—that the tendency is to drive each grain from the center outward, and so act upon all the grains alike, producing a most desirable uniformity in the result. The rotating action is to be continued until the movements of the grains under the forces developed generates sufficient heat to crack the cuticle and until afterward, each grain receives sufficient rubbing to remove the skin. Beyond this point the action should not be continued, as it would remove a part of the nutritious portion of the grain. The acting

surfaces of the tub and stirrers may be made of wood, metal, or stone.

In the drawings, Figure 1, represents, in a vertical, sectional elevation, a rice scouring mill, embodying my invention; and Fig. 2, is a plan of the same, with the covers and gearing by which the mill is operated, removed, to show the parts in which my invention is found.

10 *a* represents the conical or concave bottom; *b* the outer ring, concentric with the cone, (*c*), all of which parts are serrated or fluted as described and shown. The stirrers (*d*), which are fluted, as shown in the

drawings, are fixed to the arms (*e*) which are connected to the rotating shaft (*f*). 15

Having described my invention, what I claim as new, and desire to secure by these Letters-Patent, is,—

The within-described arrangement and combination of stirrers and stationary surfaces of the form described, acting together in the specified manner. 20

June 18th 1860.

DANIEL LOMBARD.

Witnesses:

J. B. CROSBY,
HENRY BURDETT.