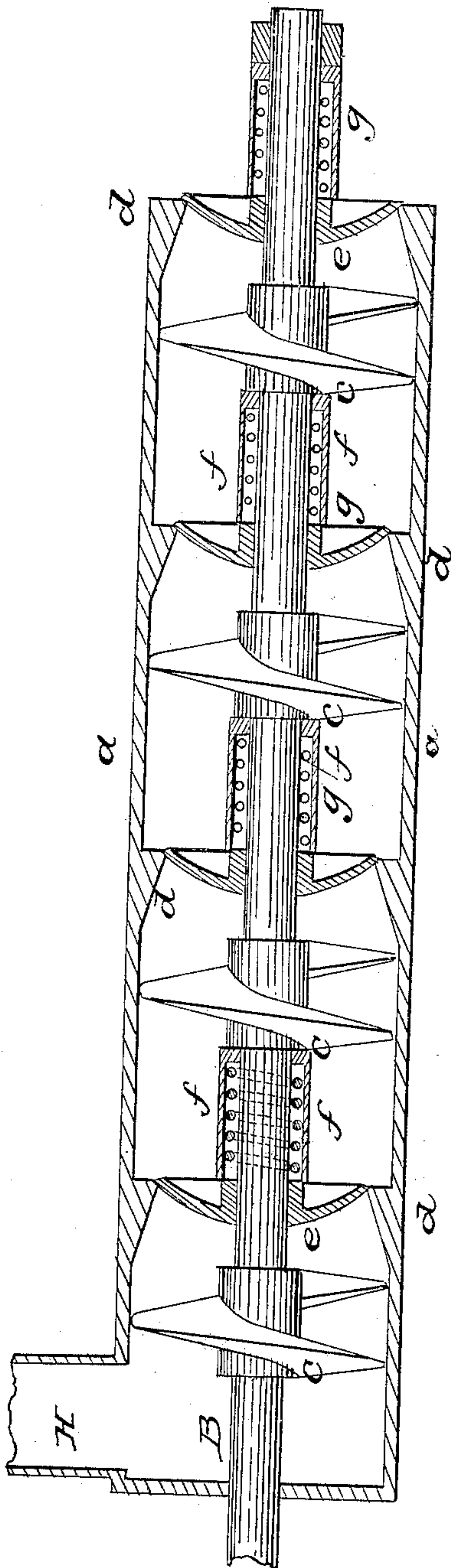


GARDNER & HOWE.

Rice Cleaner.

No. 37,093.

Patented Dec. 9, 1862.



WITNESSES  
W. B. Lassall.  
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# UNITED STATES PATENT OFFICE.

SMITH GARDNER AND A. B. HOWE, OF NEW YORK, N. Y.

## IMPROVEMENT IN CLEANING RICE.

Specification forming part of Letters Patent No. 37,093, dated December 9, 1862.

*To all whom it may concern:*

Be it known that we, SMITH GARDNER and AMASA B. HOWE, both of the city, county, and State of New York, have invented a new and useful machine or apparatus for cleaning rice, coffee, and other grains or seeds by scouring off and removing the inner skin or cuticle; and we hereby declare that the following is a full and exact description of the construction and operation of the machine, reference being had to the accompanying drawing, which shows a longitudinal section, making a part of this specification.

The invention consists of a hollow cylinder (marked *a a* in the drawing) about six feet long and about ten inches in diameter, in which a shaft (marked *B*) is placed, which projects out beyond the ends of the cylinder sufficiently to receive bearings and a pulley. This shaft is mounted with a series of short screws or propellers, (marked *c c c c*), which are made fast to it. They are about eight inches apart, and as large in diameter as will allow of their revolving freely in the cylinder. Near the discharge ends of these propellers the cylinder is contracted or reduced in diameter about two inches. The reductions commence at the ends of the propellers and terminate in an abrupt ledge about three inches from the place of commencement. They are marked *d d d d*. Round plates or disks (marked *e e e e*) are mounted on the shaft against these ledges, their diameter being about one-quarter of an inch larger than the inner circle of the ledge. They may be made flat or crowning, as is shown in the drawing. A hub at the center of each plate projects about two inches on one side, which we call the "back side." Spiral springs (marked *f f f f*) are placed on the shaft at the back of these plates, which bear against the hubs and press the face of the plates against the ledges.

To prevent the grain from obstructing the operation of the springs, sleeves (marked *g g g g*) are fitted on the shaft, which inclose the springs and also the extreme ends of the hubs on the plates. The springs rest against a flange in the lower end of the sleeve, which flange sets loosely on the shaft. The springs and hubs move freely backward and forward in the sleeves when the machine is in operation.

The sleeves and plates are loose on the shaft, and do not revolve with it.

The machine, when thus constructed and mounted on a suitable frame, is then ready for operation, which operation is as follows, viz: The grain is fed into the cylinder at one end, which we call the "upper end," through an opening made for that purpose, and marked *H*. The shaft *B* is then made to revolve three hundred or four hundred times a minute, by any of the well-known mechanical devices, in the direction to propel the grain through the cylinder and discharge it at the opposite end. Its passage through the cylinder is resisted or opposed by the plates *e e e e*, which it cannot pass until the pressure produced upon it by the operation of the propellers is sufficient to overcome the strength or power of the springs and force the plates back from the ledges, and thus open a passage for it to escape. The grain, while passing between the propellers and the plates, which are three or four inches apart, is in a highly compressed state and subjected to powerful agitation and friction by the operations of the propellers. This operation upon the grain is repeated by each propeller as it passes from one to the other through the cylinder, which loosens and scours off the skin and cuticle, which is mainly accomplished by rubbing the grains against each other in the manner herein described.

We are aware that machines constructed of a cylinder and a revolving screw for cleaning grain are not new.

We have found that machines with series of screws or propellers—say three or four—operate to good advantage; but where a small amount of friction is sufficient to remove the cuticle from the grain, (which is sometimes the case,) the operation may be performed to advantage with a short cylinder and one propeller and one plate.

The plate and spring may be mounted on the shaft outside of the cylinder, in the manner shown in the drawing, at the lower or discharge end of the series.

By fixing the plates *e e e e* permanently at a proper distance from the ledges the machine can be operated without springs, but not to as good advantage as with them.



Machines may be made of iron or any other suitable material and of any convenient size or length; but we prefer the dimensions described. They work to the best advantage in a vertical position, but can be worked horizontally.

What we claim as our invention, and desire to secure by Letters Patent, is—

One or a series of screws revolving in a

cylinder and operating in conjunction with the disk or disks, substantially in the manner described, and for the purposes set forth.

SMITH GARDNER.  
A. B. HOWE.

Witnesses:

W. B. LASSCELL,  
JAS. D. BRYANT.