2 Sheets—Sheet 1.

GARDNER & HOWE.

Grain Hulling Machine.

No. 51,445. Patented Dec. 12, 1865.

Fig. 1

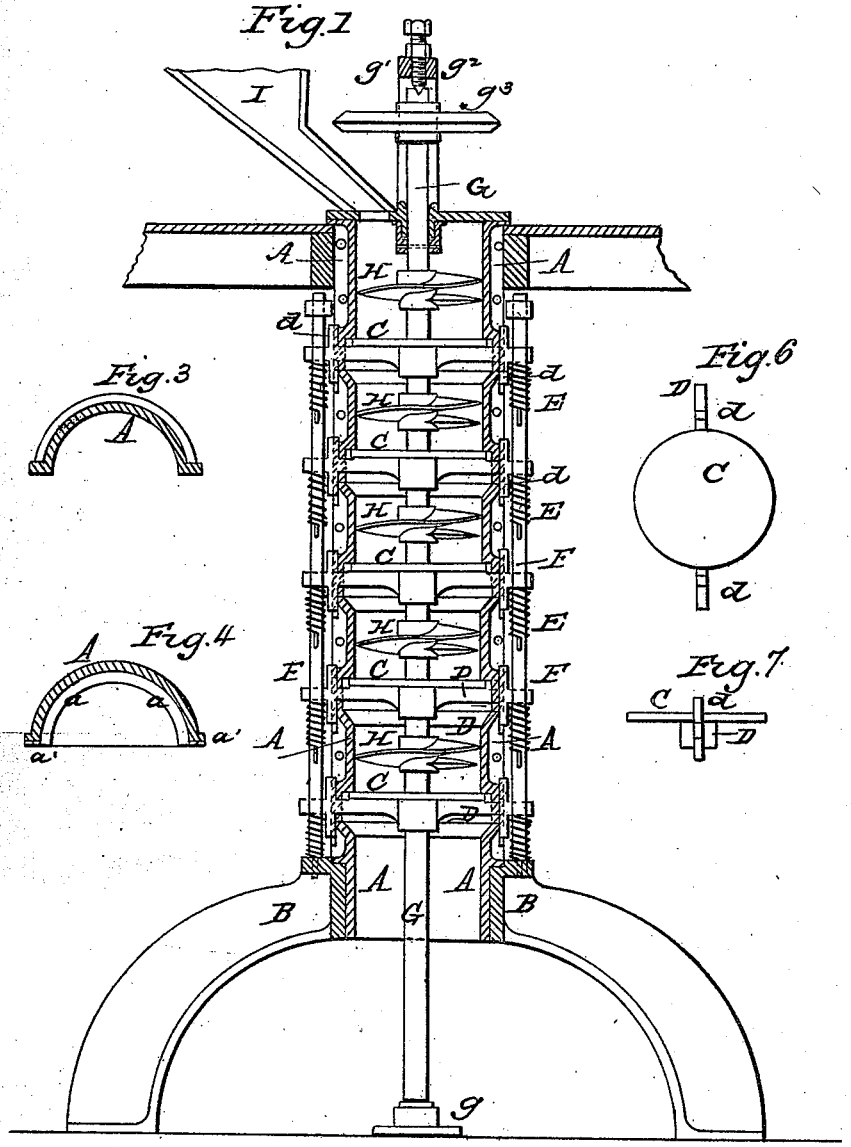

Fig. 3

Fig. 4

Fig. 6

Fig. 7

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Fig. 2

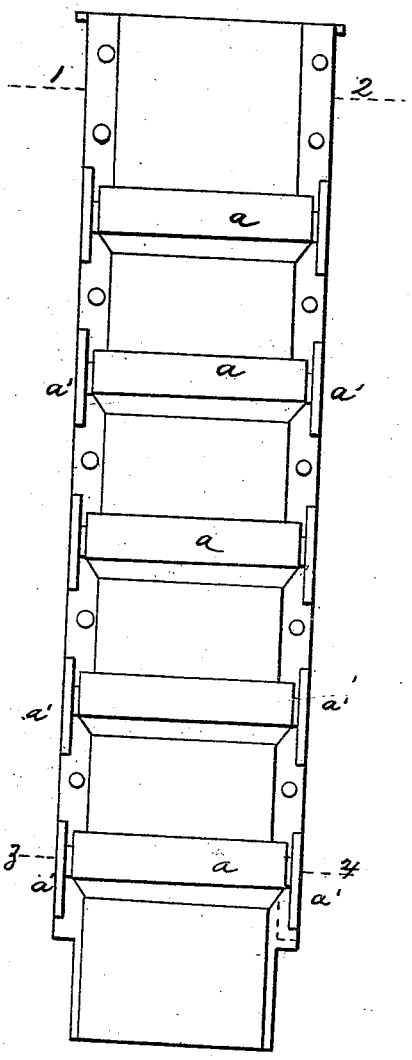
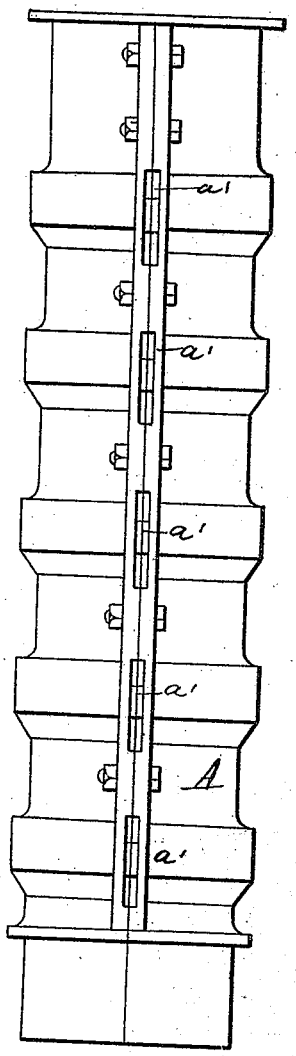


Fig. 5



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UNITED STATES PATENT OFFICE.

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

IMPROVEMENT IN GRAIN-HULLING MACHINES.

Specification forming part of Letters Patent No. **51,445**, dated December 12, 1865.

To all whom it may concern:

Be it known that we, SMITH GARDNER and AMASA B. HOWE, in the city, county, and State of New York, have invented certain new and useful Improvements in Machinery or Apparatus for Cleaning Rice, Coffee, and other Grains and Seeds; and we do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, the same being improvements on our invention patented December 9, 1862, in its construction and operation for the same purpose.

In the accompanying drawings, Figure 1 shows the improved apparatus in partial sectional elevation, one-half of the case being removed to exhibit the internal construction of the working parts.

The apparatus may be described as consisting of a vertical cylindrical case, D, closed at top by a cover, but open at bottom, and mounted upon a hollow frame or standard, B. This cylinder is cast in the form of two semi-cylinders, the one being the counterpart of the other. Fig. 2 is an elevation of one of these semi-cylinders, showing its inner face. Fig. 3 is a sectional plan taken in the line 1 2, and Fig. 4 a sectional plan taken in the line 3 4, of Fig. 2. These semi-cylinders are cast with flanges at their edges to facilitate the coupling of the parts together, bolts and nuts being used for the purpose, as shown at Fig. 5, which is an outside view of cylindrical case *a* complete. This cylindrical case is formed with annular recesses *a a*, at equal distances apart (say twelve inches) throughout its length, to receive horizontal disks C, which are somewhat smaller in diameter than the recesses, and are free to move up and down in the recesses. These disks are each carried by a horizontal cross-bar, D, (see the detached views, Figs. 6 and 7,) the ends of which project through vertical slots made in the cylinder *a*, and all formed with vertical arms *d*, which fit into vertical recesses *a'* in the flanges of the cylinder. These vertical arms are of sufficient length to overlap the recesses at top and bottom to prevent escape of the grain. These recesses form guides for steadying the movements of the cross-bars D and their disks C, permitting the disks to rise and fall when required.

The cross-bars rest upon pairs of springs E E, which are coiled around vertical rods F, outside the cylinder. These rods rest in bearings in the frame B, and are supported at their upper ends by lugs attached to the cylinder. They are provided with slots for receiving the projecting ends of the cross-bars D.

The springs E give the disks a tendency to retain their highest position in the annular recesses *a*, as shown at Fig. 1, being for that purpose confined between keys on the rods F F or other fixed points and the extremities of the cross-bars D.

When the disks are depressed by the means to be presently explained, the upward pressure of the springs will give them a tendency to regain their elevated position.

In the cylinder A, and concentric therewith, a vertical shaft, G, is mounted, central holes being made in the disks for it to pass freely through. To this shaft is keyed, above each disk, an Archimedean screw or propeller, H, of such diameter as will allow of its rotating freely in the cylinder.

The shaft G rests in a foot-step, *g*, and works in a stuffing-box in the cover of the cylinder. It is prevented from rising in the bearings by a regulating-screw, *g'*, (which is carried by an arched cross-piece, g^2,) pressing on the upper part of the shaft.

Rotary motion is transmitted to the screw-shaft from any suitable motive-power engine through a bevel-wheel, g^3, keyed on the screw-shaft.

I is an elevated hopper, the chute of which guides down into the cylinder the grain to be operated upon in a continuous stream, which may be regulated, by a slide or otherwise, to adapt the amount of feed to the capacity of the apparatus.

When starting the apparatus the disks are all at their highest position, as shown at Fig. 1, and they thus divide the cylinder into a series of separate and disconnected chambers. As soon, however, as the grain supplied from the hopper I accumulates in the uppermost chamber sufficiently for the screw in that chamber to act upon it, the screw H will, by its continued rotation, press down the grain, thereby causing the disk, which forms the floor of the upper chamber, to yield, and by descending allow the grain to escape over the periphery of the disk and fall through the an-

nular recess *a* into the chamber below. By this means the grain will quickly accumulate below the rotating screw in the second chamber, when it will in like manner cause the second disk to yield to the downward pressure put upon it. The grain will then escape into the chamber below, and in like manner be forced into the next lowest, and so on throughout the series of chambers, until it is discharged at the bottom of the apparatus. While thus passing through the apparatus the compact masses of grain are subjected to considerable friction, grain rubbing against grain, as well as against the sides of the stationary cylinder and moving surfaces of the propelling-screws. The effect of this friction will be the abrasion or grinding off of the cuticle of the grain or seed, which cuticle falls out of the apparatus in the form of dust together with the cleaned seed. This seed or grain, when screened of the dust, is ready to be passed through a polishing-machine, whereby it is fitted for the market. The amount of friction thus put upon the grain may be regulated by adjusting the pressure of the springs that carry the disks, by means of the keys passing through the supporting-rods F F.

Instead of the springs being regulated by keys, as described, a screw-thread may be cut on the rods or supports throughout their length, on which nuts may be fitted for adjusting the pressure of the disks.

Having explained the construction and operation of our improved machinery or apparatus, what we desire to secure by Letters Patent is—

So arranging and mounting the disks C and arms D with the rods or supports F F, springs E E, and the keys in the rods or supports that the pressure or resistance of the disks may be regulated and adjusted at pleasure throughout the series of disks when the machine is in motion, substantially as shown and described.

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Witnesses:
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