

I. D. & A. CRAWFORD.  
Hulling Machine.

2 Sheets—Sheet 1.

No. 111,323.

Patented Jan. 31, 1871.

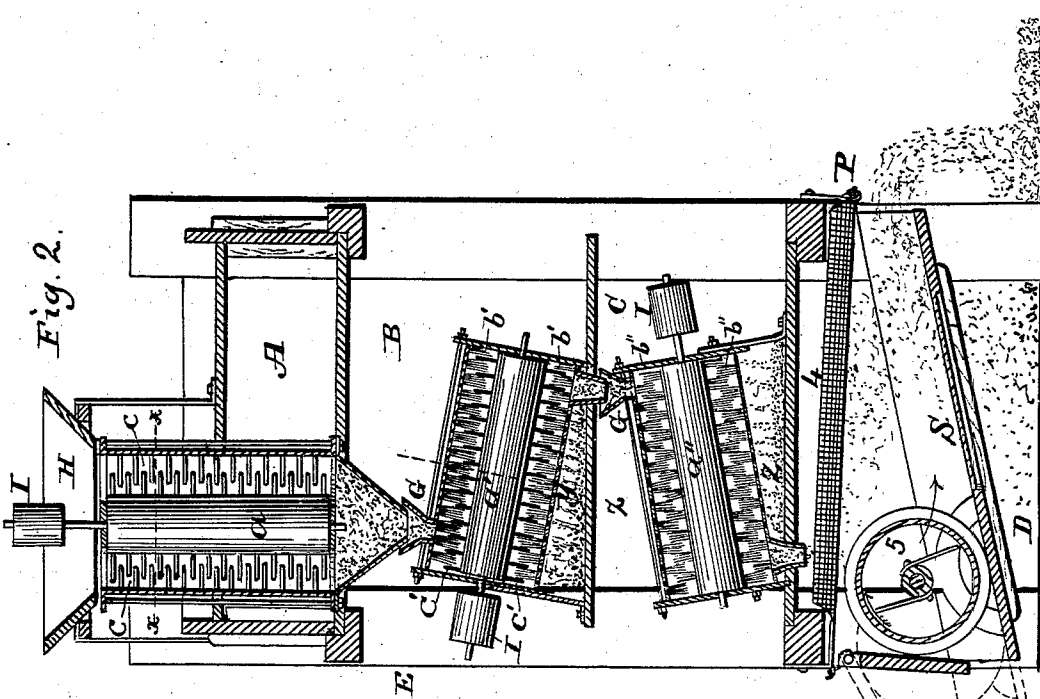


Fig. 2.

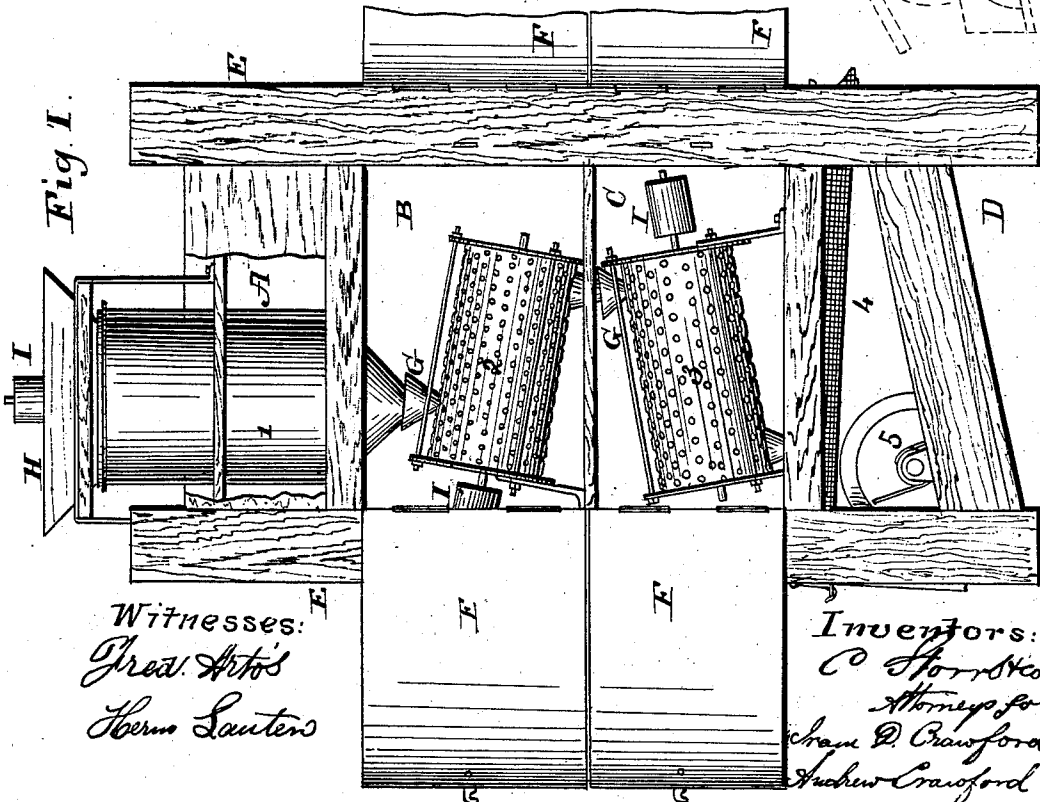


Fig. 1.

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Fig. 3.

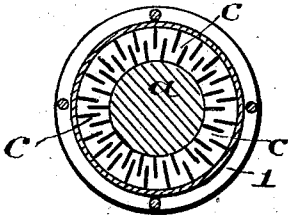


Fig. 4.

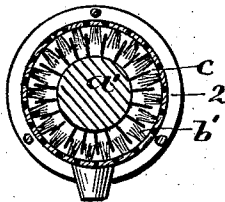


Fig. 5.

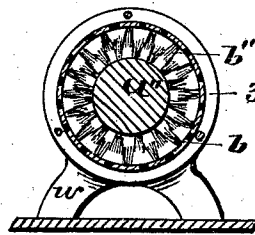


Fig. 6.

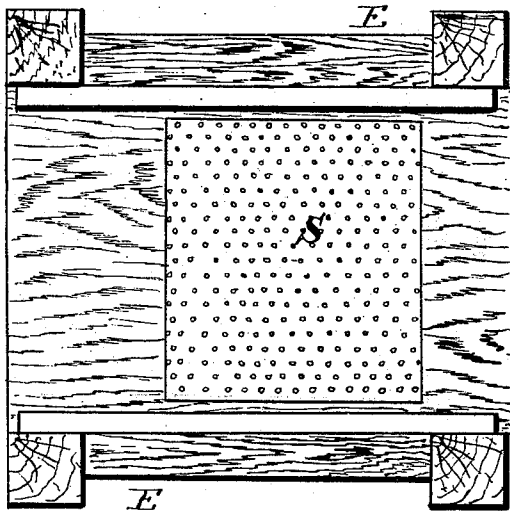
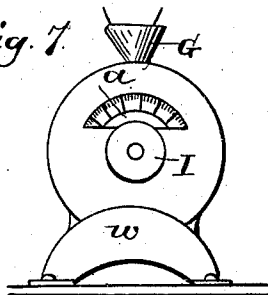


Fig. 7.



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# UNITED STATES PATENT OFFICE.

ANDREW CRAWFORD, OF WILKES-BARRÉ, PENNSYLVANIA, AND IRAM D. CRAWFORD, OF BLOOMINGTON, ILLINOIS.

## IMPROVEMENT IN GRAIN, COFFEE, AND RICE CLEANERS.

Specification forming part of Letters Patent No. 111,323, dated January 21, 1871.

*To all whom it may concern:*

Be it known that we, ANDREW CRAWFORD, of Wilkes-Barré, Luzerne county, State of Pennsylvania, and IRAM D. CRAWFORD, of Bloomington, McLean county, State of Illinois, have invented certain Improvements in Grain, Coffee, and Rice Cleaners and Hullers, of which the following is a specification.

The first part of our invention consists in applying a brush made partly of steel and partly of bristles to the cleaning, scouring, and hulling of wheat, barley, coffee, rice, and spices, whereby all beards, fuzz, and dirt, or other impurities are removed, so that no foreign substance is attached to or mingled with grain or spices for domestic use, flouring, or distilling.

The second part of our invention consists in the combination and use of upright and inclined perforated cylinders, whereby the dirt or hulls are first thoroughly beaten up and then passed slowly through the cleansing, scouring, and separating process.

In the accompanying drawings, Figure 1 is a side elevation of a machine embodying our invention. Fig. 2 is a vertical section of the same. Fig. 3 is a horizontal transverse section of solid cylinder No. 1, showing the brush *c*, exclusively of steel wire. Fig. 4 is a vertical transverse section of cylinder No. 2, showing the brush partly steel, *a'*, partly bristles, *b' b'*, with a section of the conducting-funnel *G*, common to cylinders 2 and 3. Fig. 5 is a vertical transverse section of cylinder No. 3, showing the brush wholly of bristles *b'' b''*, and the support *w*, common to cylinders 2 and 3, whereby they obtain their inclination. Fig. 6 is a bottom view of the frame, showing the sand-screen *S*. Fig. 7 is a front view of cylinders 2 and 3 with the conducting-funnel *G*.

*H* is a common hopper, after the style of ordinary grist-mill hoppers, serving only the purpose of a conduit. A common funnel-shaped spout will answer every purpose. It may be connected with a thrashing-machine or storage, where grain or spices are kept in bulk and require cleaning or hulling.

*A* is a chamber occupied by the upright solid cylinder No. 1, the upper portion of which sustains the hopper.

*B* and *C* are chambers occupied, respectively, by the perforated cylinders Nos. 2 and 3.

*D* is a chamber occupied by the shaking screen and fan. Fitted into and forming the lower floor of this chamber is a sand-screen, through which the heavy dirt and sand fall to the ground.

No. 1 is an upright solid cylinder, made of brass or Russia iron, in which is revolved, by ordinary gear, a shaft covered by a brush, *a*, made of steel wire of firm quality, slightly roughened, which is meshed into another brush, *c*, of the same material, similarly made, covering the concave of the cylinder. The purpose of constructing the brushes in this cylinder exclusively of steel wire of a somewhat coarse quality, roughened, as already described, is to give the machine the power of breaking up lumps of dirt, rat-dung, beards, hulls, &c., without injury to the kernel of the grain.

This purpose is further followed up by cylinder No. 2, which is made of the same material as No. 1, but not necessarily so firm, perforated from the inner side with holes or slits, by means of which, as in the cylinder next to be described, a portion of the dirt is driven out as the cleaning proceeds, and confined in the chambers *B* and *C*, whence it is removed through the doors *F F F F*, forming sides of said chambers. In this cylinder, as in No. 1, is revolved a shaft-brush, *a'*, meshed into a concave brush, *b'*, made of coarse firm bristles, and a quality of steel wire finer than in No. 1, equal proportions of each, bristles and wire, alternately set—that is, a setting or tuft of wire, then of bristles, from one end to the other of the brushes. The brushes are constructed long and narrow, extending from end to end of the cylinder, so as to act uniformly upon the grain or spices, and alternated with the holes or slits, which are arranged in narrow rows from end to end of this and of cylinder No. 3, next to be described.

Cylinder No. 3 is constructed of the same material as the preceding. The brushes *a'' b''* are made exclusively of bristles, the purpose being to cleanse and purify the kernel or bulk rather than to break up masses of dirt. The holes or slits are about twenty per

cent. larger than in the preceding cylinder, so as to facilitate, to the greatest degree compatible with retention, the escape of the comminuted dirt, and are arranged in rows throughout the cylinders, perforated from within, and the holes or slits alternate with the brushes, as already described in No. 2. Both of the latter-described cylinders are set at angles of about thirty-five degrees, such as to give a moderate rate of speed to the grain, but not to clog it. From the cylinder No. 3 the mass of grain, now thoroughly scoured and separated from the light dirt by means of the perforated cylinders, or what may be appropriately termed "cylindrical screens," falls upon a shaking screen, designated in the drawings as No. 4, whose meshes are sufficiently large to separate any weed-seeds, cockle, heavy dirt, and sand, the latter two of which and their kindred are finally disposed of by the sand-screen S, which forms part of the ground or bottom floor of the machine. Beneath the shaking screen, at a practical distance back of the falling mass, is placed a fan, designated in the drawings as No. 5, which is designed to give completion in separating any light dust or hulls or the like accompanying the grain or spices before falling into bags or boxes for use.

By reference to Figs. 1 and 2 the extremities of the shafts I I will be seen, to which are attached bands whereby the machine is driven. More especially, by reference to Fig. 2, as already described, the sections of the cylinder  $x x$ ,  $y y$ , and  $z z$  are shown, inclosing sections of the shafts  $a a a$ , covering which will be seen the distinctive character of the brushes,  $c c$  indicating those parts manufactured of steel

wire,  $b b$  indicating those of bristles. In the same figure will be seen a section of the shaking screen and fan 4 and 5, and the sand-screen S, and the bag or box which receives the purified mass P. The power necessary to drive the shafts will be light; the speed governed by the purpose to be obtained, whether breaking up dirt, rat-dung, or hulls, removing caps, beards, or fuzz; the methods of connecting with the driving-power simple, and the space to be occupied small, as well as expense of construction.

We claim as our invention and desire to secure by Letters Patent—

1. The rotary wire-studded cylinder  $a'$ , in combination with the hollow perforated cylinder 2, furnished with the compound brush of bristles and stiff wires, substantially as described.

2. The combination and arrangement of the hopper H, vertical cylinder 1, with its rotary and fixed brushes  $a$  and  $c$ , inclined perforated cylinder 2, with its brushes  $a' b'$ , inclined perforated cylinder 3, with its brushes  $a'' b''$ , connecting-funnels G G, shaking screen 4, sand-screen S, and fan 5, substantially as and for the purpose specified.

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