2 Sheets—Sheet 1.

E. H, L. L. & E. A. GRAVES.

RICE-HULLER.

No. 189,725. Patented April 17, 1877.

Fig. 1.

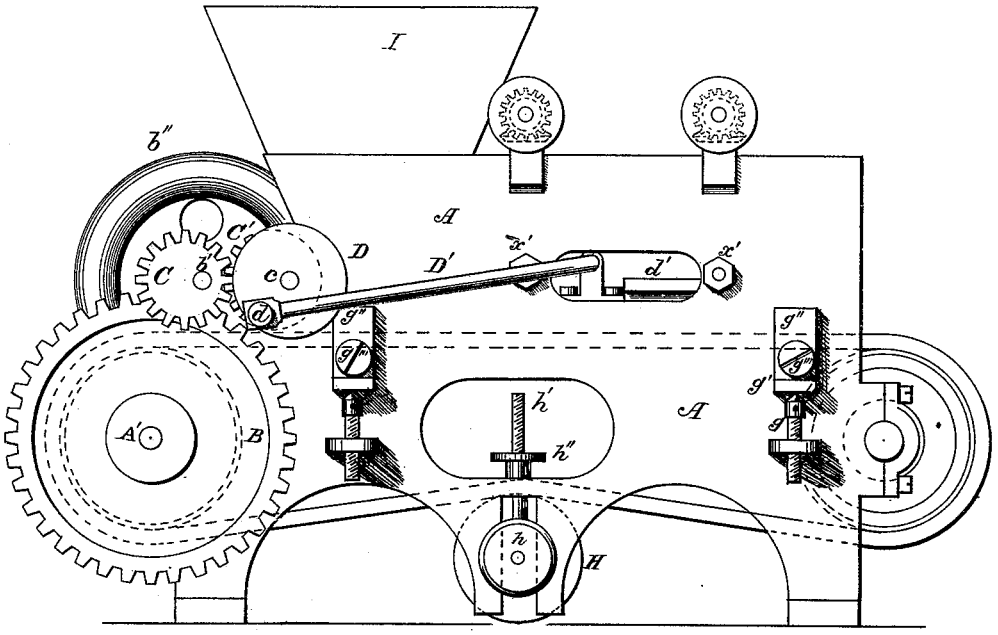
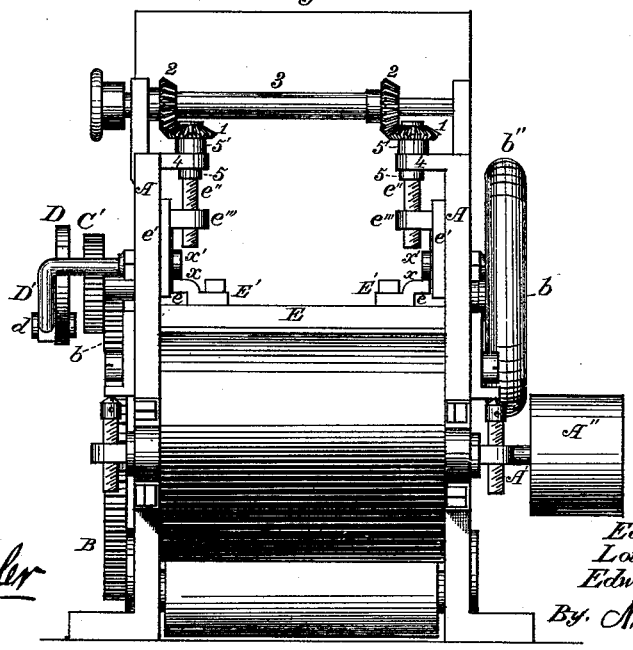


Fig. 2.



Attest:
F. Y. C. Schott.
J. Mason Gorgler

Inventor:
Edward H Graves.
Louis L. Graves.
Edward A Graves.
By. N. Crawford
Atty.

2 Sheets—Sheet 2.

E. H, L. L. & E. A. GRAVES.

RICE-HULLER.

No. 189,725. Patented April 17, 1877.

Fig. 3.

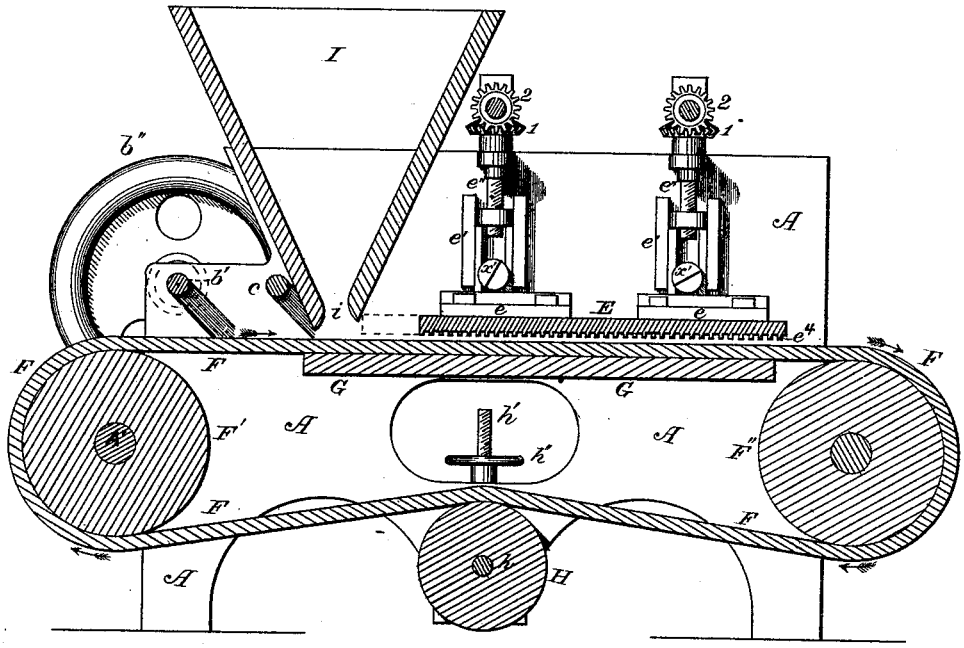


Fig. 4.

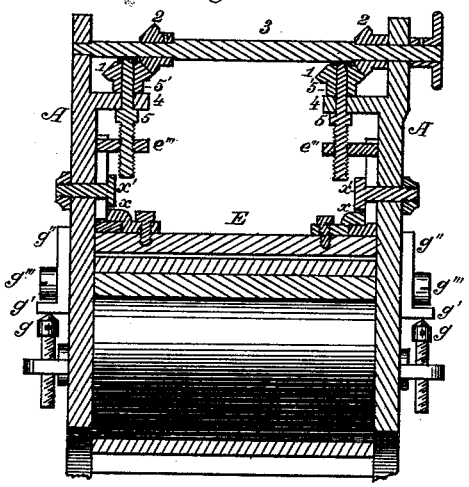
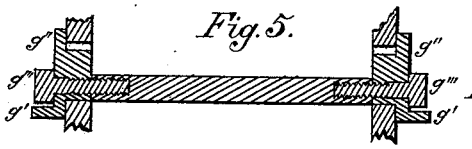


Fig. 5.



Attest:
F. H. Schott
J. Mason Boggler

Inventor:
Edward H. Graves.
Louis L. Graves.
Edward A. Graves.
By N. Crawford
Atty:

UNITED STATES PATENT OFFICE.

EDWARD H. GRAVES, LOUIS L. GRAVES, AND EDWARD A. GRAVES, OF BATAVIA, ILLINOIS.

IMPROVEMENT IN RICE-HULLERS.

Specification forming part of Letters Patent No. **189,725**, dated April 17, 1877; application filed March 10, 1877.

To all whom it may concern:

Be it known that we, EDWARD H. GRAVES, LOUIS L. GRAVES, and EDWARD A. GRAVES, all of Batavia, in the county of Kane, in the State of Illinois, have jointly made certain Improvements in Machines for Hulling Rice, of which the following is a specification:

The object of this invention is to produce a simple, cheap, at the same time a durable, machine that is easily understood and managed while in operation; and it consists in the construction of the parts, as will be fully hereinafter described.

In the drawings, Figure 1 is a side view of the machine; Fig. 2, an end view; Fig. 3, a longitudinal upright sectional view; Fig. 4, a transverse sectional view; and Fig. 5 details of parts.

A represents the supporting-frame of the machine, and upon or to which all the operating parts are attached. A′ is the main driving-shaft, placed horizontally across at one end of the frame, and is journaled in proper bearings attached to frame A. A″ is the driving-pulley, fast to shaft A′, and by which motion is given to the operating parts of the machine. B is a gear-wheel, fast on the end of shaft A′, opposite to the driving-pulley A″. *b* is a toothed pinion, fast to horizontal shaft *b*′, which is placed across the machine, and revolves in journals or bearings in the frame A. Pinion *b* gears into, and is revolved by, gear-wheel B. *b*″ is a fly-wheel, on the outer end of transverse shaft *b*′, to equalize the motion of the machine. C is an eccentric gear-wheel, on the outer end of shaft *b*′, and revolves with it. C′ is another eccentric gear-wheel, gearing into, and is revolved by, wheel C, is fast upon its shaft *c*, which is placed transversely across the machine, and turns in proper bearings in frame A. D is a crank-disk, centrally secured upon the end of shaft *c*, and revolves with the shaft and gear-wheel C′. D′ is a pitman, attached to crank-disk by pin *d*, and at its other end to a reciprocating hulling-plate, and by which a reciprocating motion is given to the rail hulling-plate.

Only one pitman is shown; but two may be used, as it would give motion to both sides of the reciprocating hulling-plate simultaneously.

d′ are openings, made in the sides of frame A, to receive the pitman and allow it to move therein in giving a reciprocating motion to the hulling-plate. E is the hulling-plate, made preferably of metal, with corrugations or transverse projections e^4 on its under side, and is caused to reciprocate horizontally within the frame A by the pitman D′, and its train of moving gear-wheels C′, C, *b*, and B, and through the pair of eccentric gear-wheels C and C′ it will be reciprocated in its forward movement with greater velocity than in its backward reciprocation. This hulling-plate is made to freely slide horizontally, and be guided in such reciprocations by adjustable inwardly-projecting lugs *e e*, that are attached to an upright body, *e*′, and are moved by screws *e*″, that pass through inwardly-projecting lugs *e*‴, at the upper ends of the bodies *e*′, and are screw-tapped to receive the adjusting-screws *e*″. E′ E′ are keepers, screwed fast to the upper side of the hulling-plate, and have flanges *x* rising above the lugs *e*, and projecting outward, so that the lugs *e* will be underneath them, which effectually keeps the hulling-plate in the desired position. The two adjusting-screws *e*″ are simultaneously revolved by the miter gear-wheels 1 on screws *e*″, and wheels 2 on shaft 3, that has its bearings on frame A, while the screws *e*″ revolve in a bearing in lugs 4 4, that project inwardly from the frame A, and have the proper collars 5 5 to hold them from endwise reciprocation, so that revolving the screws *e*″ in one direction will raise the hulling-plate, and the reverse direction will lower the plate. Each end of the hulling-plate is adjusted in the same way and by the same contrivances, and when adjusted to the proper height are held in such position by clamping-screws *x*′ *x*′ that go through a vertical slot in the bodies of the adjusting-plates and through a hole in the frame A. F is an endless feeding and hulling apron, working around drums F′ and F″, and passing longitudinally and horizontally through the machine, and is driven by the drum F′ on shaft A′, is preferably made of

rubber or other yielding and textile material in contradistinction to an unyielding surface. G is an adjustable bed-plate, located between the sides of frame A, and underneath the reciprocating hulling-plate, and forms a permanent rest for the endless apron underneath the hulling-plate, to hold the apron in the right relative position or distance from the hulling-plate, and resist the force acting to press the belt away from the hulling-plate while in operation. Plate G is adjusted to be higher or lower by the adjusting-screws *g g* screwing into projecting nuts on the side of frame A, and acting upon projecting lugs *g'* of the slides *g''*, held fast to plate G by the clamping-screws *g'''*.

The slides *g''* can rise or fall in slots in the sides of frame A, and when in the desired position the clamping-screws *g'''* are turned up hard and hold the projecting part of the slide against the side of frame A, and thus secure the plate in its position.

To keep the endless apron F in proper strain, a tightening-pulley, H, is placed transversely and under the belt on shaft *h*, which works in proper bearings in slots or other devices in the sides of frame A, and is constructed to be raised or lowered by the adjusting-screws *h'* and thumb-nut *h''*, so as to always give the right strain upon the feed-apron to work correctly.

I is the tapering hopper, into which the undressed rice or grain is placed to be operated upon, which is fed along under the reciprocating hulling-plate E by the feed-belt going in the direction of the arrows, and carrying the rice evenly distributed upon the whole width of the feed belt or apron by the narrow opening *i* at the bottom of the hopper.

The feed may be regulated by having the hopper at a greater or less distance from the feed belt or apron.

Operation: The grains of rice are carried from the receiving-hopper underneath the reciprocating corrugated hulling-plate by the feed belt or apron, and the corrugations in the hulling-plate receive such grains and hold them parallel with the corrugations or grooves, which, not being so deep as the kernels or grains are in diameter, forces them by the motion of the hulling-plate to be rolled over and over upon the yielding and traveling feed-apron, and thereby splitting the hull or husk lengthwise of the grains, and by a repetition of such movements under the reciprocating hulling-plate the grains will be completely divested of their husks, and by having unequal motion in its reciprocations—that is, when moving with the feed-belt the movement is faster than when the motion is reversed—the grain, after being hulled, is carried out from under the hulling-plate by the feed-belt, and out of the machine into any receptacle to receive it, or into a separator, to separate the hulls or chaff from the grains and the whole grains from the broken ones.

By this process fewer grains are broken; consequently the value of the dressed grains is relatively increased.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

1. In a machine for hulling rice, the yielding feed-belt F, in combination with the adjustable reciprocating and corrugated hulling-plate E, as and for the purposes described.

2. In a machine for hulling rice, the combination of the adjustable bed-plate G and the carrying or feed belt F, and a suitable hulling-surface, as and for the purposes substantially as described.

3. In a machine for hulling rice, the combination of the reciprocating and corrugated hulling-plate E with the gear-wheels C C' and pitman D', whereby the hulling-plate is given an unequal motion in its forward and backward movements, substantially as and for the purposes described.

4. In a machine for hulling rice, the combination of a yielding endless feed-belt, F, a reciprocating hulling-plate, E, having a corrugated or roughened hulling-surface, and moving with the belt faster than in its reverse movement, and a bed-plate, G, that is adjustable, to sustain the feed-belt in position with relation to the hulling-plate, substantially as described.

5. In a machine for hulling rice, the reciprocating hulling-plate E, having corrugations in its face at right angles to the direction in which the feeding-belt F moves, substantially as described.

EDWARD H. GRAVES.
LOUIS L. GRAVES.
EDWARD A. GRAVES.

Witnesses as to E. H. and L. L. Graves:
JAY BAKER,
CLARA I. GRAVES.

Witnesses as to Edward A. Graves:
FAWCETT PLUMB,
JAY BAKER.