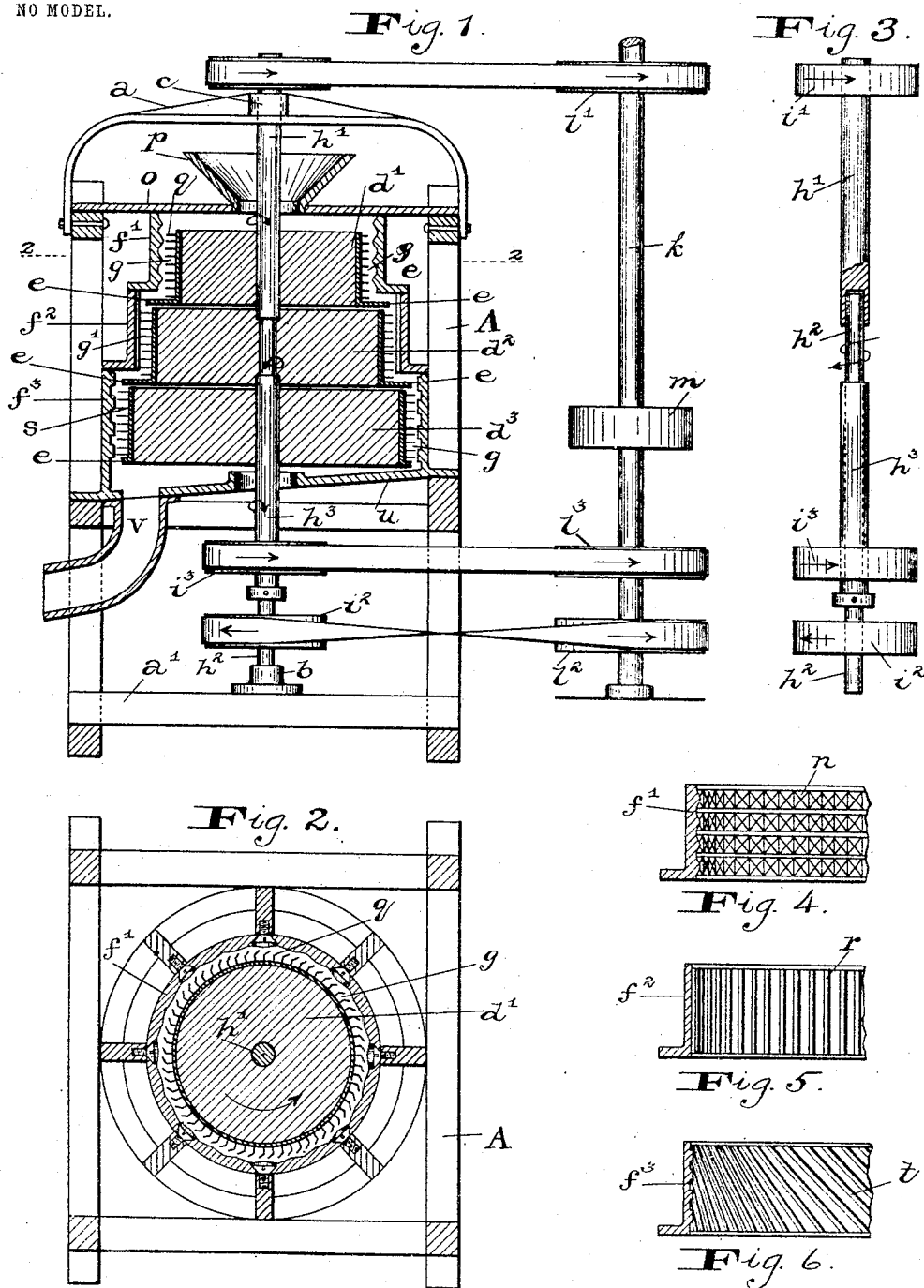


R. W. WELCH.

MACHINE FOR HULLING AND DECORTICATING RICE.

APPLICATION FILED JUNE 13, 1904.

NO MODEL.



Witnesses:
J. H. Sirich Jr.
L. Ferdinand Vogt.

Inventor.
Rosa W. Welch
 By *Manu D. Co.*
 Attorneys

UNITED STATES PATENT OFFICE.

ROSIA W. WELCH, OF BALTIMORE, MARYLAND, ASSIGNOR TO WARREN H. SADLER, OF BALTIMORE, MARYLAND.

MACHINE FOR HULLING AND DECORTICATING RICE.

SPECIFICATION forming part of Letters Patent No. 777,986, dated December 20, 1904.

Application filed June 13, 1904. Serial No. 212,271.

To all whom it may concern:

Be it known that I, ROSIA W. WELCH, a citizen of the United States, residing at Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Machines for Hulling and Decorticating Rice, of which the following is a specification.

This invention relates to a machine for hulling and decorticating rice.

An object of this invention is to provide an improved cylindric shell or case for rice-hulling machines, which case shall be effective, cheap, and durable; and another object is to provide an improved rice huller and decorticator having a series of vertical cylinders, one above the other, the diameter of each cylinder being greater than the diameter of the cylinder next above it, circumferential steps being formed at the bottom of each cylinder and every other cylinder revolving in one direction at the same time that the alternate or intermediate cylinder revolves in the reverse direction, whereby the rice will be first hulled and then decorticated.

Referring to the drawings, Figure 1 is an elevation of the machine, the outer shell being in section. Fig. 2 is a horizontal section of the machine. Fig. 3 is a view of the vertical shaft on which the cylinders are mounted. Fig. 4 is a perspective view of the inner surface of the uppermost shell. Fig. 5 is a perspective view of the inner surface of the second shell or the shell next to the uppermost one. Fig. 6 is a like view of the lower shell.

A rectangular frame A is provided with upper and lower cross-bars a a' , a step-bearing b is on the base of said frame, and the cross-bar at the top of the frame has a shaft-bearing c . In the present instance three cylinders are shown, the uppermost one, d' , being the smallest, the second cylinder d^2 having a diameter greater than that of the one above it, and the lowermost cylinder d^3 , which in the present instance is the third, having a still greater diameter. Each cylinder preferably has at its bottom a circumferential projecting flange or step e , which extends beyond the circumference of the cylinder next below it.

Each cylinder is surrounded by a ring-shell

f' f^2 f^3 large enough to inclose it and form an annular space g between. It will be seen the face of each cylinder revolves within the particular ring-shell that incloses it; but the flange or step e revolves within the next lower and larger ring-shell. This construction of step e serves to sustain the rice-grains within the vertical annular space g while the cylinder revolves, and thus prevents a too rapid down passage of the grains and yet permits the next cylinder below to revolve in the reverse direction. Were it not for the step e the grains would be drawn downwardly with too great rapidity to be effectively treated.

The first and third cylinders d' d^3 both revolve in the same direction, as shown by darts, while the intermediate or second cylinder d^2 revolves in the opposite direction. This reverse revolution of alternate cylinders is believed to be most useful and effective in the operation of hulling rice, as thereby the hulls are thoroughly removed without breaking or injuring the rice-grains. To effect this reverse revolution of the cylinders, a vertical shaft made in three sections h' h^2 h^3 is employed. The middle section h^2 comprises a solid shaft whose lower end rests in the step-bearing b , and the second cylinder d^2 is keyed fast to this shaft-section, which latter also carries a pulley i^2 . The lower shaft-section h^3 comprises a tube which is loose around the solid shaft h^2 , and the lower end of this tube rests upon a collar j , fixed on the said solid shaft. The third or lowermost cylinder d^3 and a pulley i^3 are keyed fast to this lower shaft-section h^3 . The upper shaft-section h' comprises either a solid shaft or a tube, as preferred. The lower end of this upper section has a bore which takes loosely over the upper end of the middle section h^2 . The first or uppermost cylinder d' and a pulley i' are keyed fast to the said upper shaft-section h' . A vertical drive-shaft k has suitable bearings and carries three driving-pulleys l' l^2 l^3 and a driven pulley m . Belts directly connect from pulleys l' l^3 on the drive-shaft to pulleys i' i^3 of the cylinder-shaft, and a crossed belt connects from pulley l^2 to pulley i^2 , said cross-belt transmitting a reverse motion or revolution.

A top or cover o is on the upper ring-shell

f' and has a hopper p , which opens in on top of the uppermost cylinder d' . The upper ring-shell f' should be made of solid metal and have its inner face, as shown in Fig. 4, provided with cross-grooves which form diamond-shaped serrations n .

The uppermost revoluble cylinder d' has its circumferential face covered with leather provided with bent elastic steel pins g , which project in an inclined rearward direction into the upper annular space g . It will be seen that rice passing from the hopper to the first annular space will be subjected to the rasping action of the elastic steel pins g and diamond-shaped serrations n , which action will loosen and tear off the husks from the rice-grains. The step e on this upper cylinder serves to sustain the rice-grains within the upper space while subjected to this action. This step on the upper cylinder revolves within the second annular space g and delivers the rice-grains with any loosened but adhering hulls and completely-hulled grains and such hulls as have been wholly detached into said second annular space. The second revoluble cylinder d'' has its circumferential surface provided in like manner to the first cylinder with rearwardly-inclined pins g' , and the second ring-shell f'' , made of metal, has on its inner surface small vertical corrugations t . In the second annular space g the partly-hulled rice is subjected to a different treatment—to wit, to a brisk rubbing action in a backward or reverse direction as compared with the upper cylinder, which completely removes all the hulls from the grains. The hulled grains and the separated hulls then pass down to the third annular space g . The third or lower revoluble cylinder d''' has its face provided with uniformly-spaced fine spring-wire teeth s , all of which are inclined rearwardly—that is, backward of the direction in which the cylinder is to rotate. These spring-wire teeth s are

similar in general shape to the pins g on the uppermost cylinder, except the wire teeth are much finer and more resilient.

The lower ring-shell f''' , made of metal, has its inner face provided with small diagonal or inclined corrugations t , extending from top to bottom of the shell, the inclination being upward relative to the direction in which the lower cylinder d''' revolves in order that the spring-wire teeth s on the said cylinder will brush the rice-grains against the upwardly-inclined corrugations t , and thereby the latter will tend to hinder the too rapid downflow of said rice-grains, and the scraping or brushing action of the fine spring-wire teeth on the grains will be thorough and the grains be completely decorticated.

At the bottom is a pan u , having a discharge-spout v to deliver the hulls and the decorticated rice.

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

A rice-treating machine having in combination a plurality of cylinders one above the other and the diameter of each cylinder below the top one being greater than the diameter of the cylinder next above it; a circumferential projecting flange on each cylinder extending beyond the circumference of the cylinder next below; a solid metal ring inclosing each cylinder and provided on its inner face with vertical serrations and elastic metal pins projecting from the circumferential faces of the revoluble cylinders in a direction that inclines rearward with respect to the direction of rotary movement.

In testimony whereof I affix my signature in presence of two witnesses.

ROSIA W. WELCH.

Witnesses:

CHARLES B. MANN, Jr.,
FELIX R. SULLIVAN.