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A. L. ROMERO

1,710,459

COMBINATION RICE HUSKER AND FLOUR MILL

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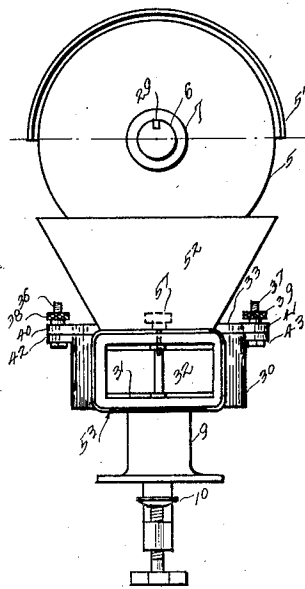


Fig. 2.

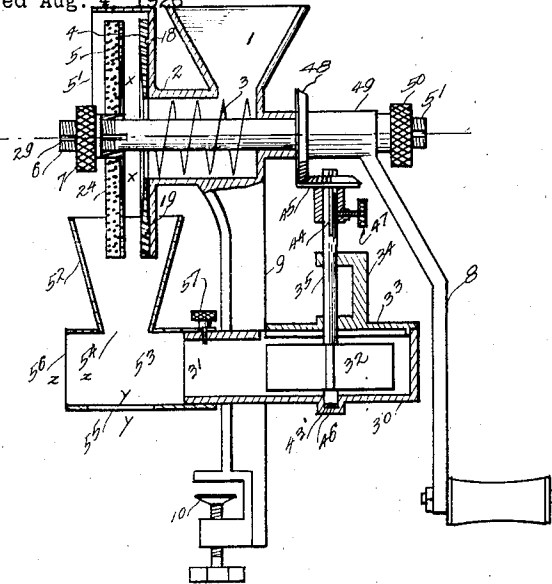


Fig. 1.

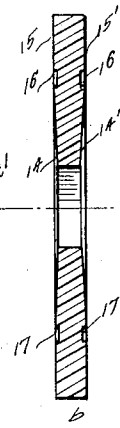
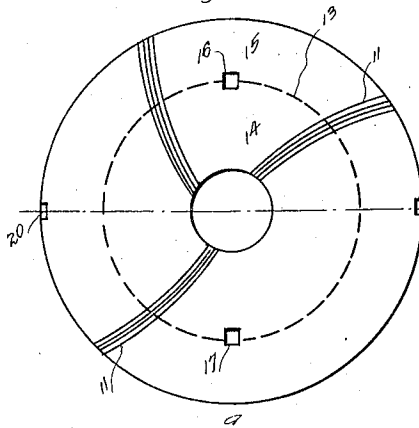


Fig. 3.
Disc 4.

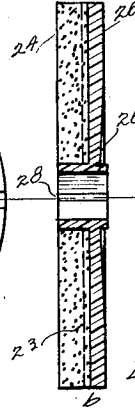
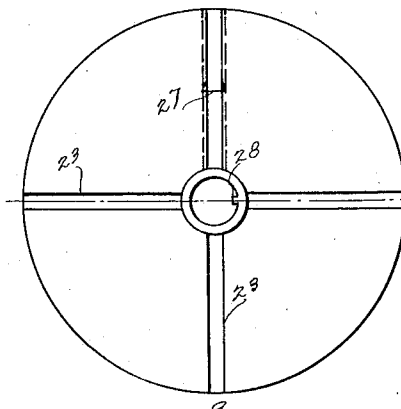
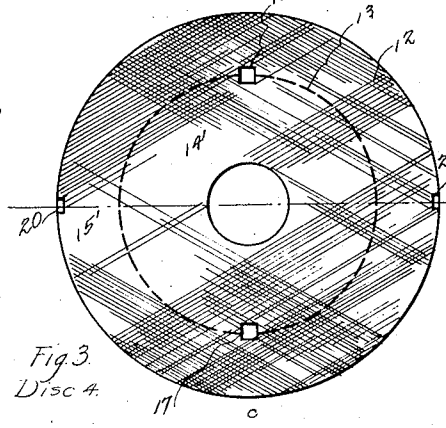
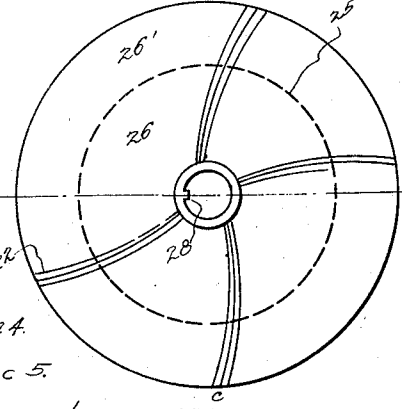


Fig. 4.
Disc 5.



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UNITED STATES PATENT OFFICE.

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COMBINATION RICE HUSKER AND FLOUR MILL.

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The invention relates to improvements in a rice-husker and flour mill in which a pair of discs husk rice as well as grind grain to flour. The objects of the improvement are, first, to provide a roughened surface on the back of one of the pair of the common flour or corn discs; second, to provide a rubber surface to the back of the other of the pair of discs; and third, to provide a detachable sorting apparatus, for separating clean rice from the loose husks and bran.

One form of the invention is illustrated in the accompanying drawing in which,

Fig. 1 is a side view of the mill, showing in section, the important parts;

Fig. 2 is a rear view of the mill;

Fig. 3, *a*, *b*, and *c*, front, section and rear views, respectively, of one of the discs; and,

Fig. 4, *a*, *b*, and *c*, rear, section and front views, respectively, of the other disc.

The general characteristics of this combination rice-husker and flour mill is the same as that of a common flour mill; viz, Figs. 1 and 2, the hopper 1 into which the grain is introduced for grinding; the working barrel 2 in which is located the screw-feeder 3 that conveys the grain between the discs 4 and 5; the discs housing 5'; the shaft 6 which carries the adjusting nut 7 and disc 5; the handle 8, the manipulation of which effects the grinding; the support 9 that supports the mill body; and the clamp 10, for clamping the mill to an edge of a table or the like.

The improvements which I claim as my own, are:

The disc 4, Figs. 1 and 3, one face of which, Fig. 3 (*a*), is provided with radial teeth 11 over its entire surface, as shown, (part only of the teeth are shown); while the other face, or the back of the same disc is provided with roughened surface 12. From some point on both sides of the disc 4 as indicated by the dotted lines 13, the surfaces 14 and 14' slant toward the center, as shown in Fig. 3 (*b*); while the surfaces indicated by 15 and 15' outside the dotted lines 13 are planes or parallel. This disc 4, has holes 16 and 17 to fit with studs or guards 18 and 19, the latter being attached rigidly to the body of the mill, in order to keep this disc 4 from movement when in grinding. Notches 20 and 21 are also provided about the rims of the disc in question, to accommodate the heads of the bolts (not shown), which bolts attach said disc 4 to the

body of the mill. The functions of the various contortions of the surfaces of this disc 4, will be explained in describing the other disc 5.

The disc 5, Figs. 1, 2 and 4, one side of which, Fig. 4 (*c*) is provided with radial teeth 22 over its entire surface (part only of the teeth are shown in the drawing); while the other side or the back of it is provided with ribs 23, or the like, to receive and hold a rubber ring 24, Fig. 4 (*b*). From some point about the face (*c*) as indicated by the dotted lines 25, the surface 26 slants toward the center, as shown in Fig. 4 (*b*); while the surface indicated by 26' outside the dotted lines 25 is plane. See Fig. 4 (*b*). The ribs 23 have an A-shaped form, as in others, and a section of which is shown at 27, in order to keep and hold the rubber ring 24 firmly. This disc 5 has a key 28 that works in the keyway 29 provided to the shaft 6, Fig. 1. The slant toothed surface 14 of the disc 4 and the slant toothed surface 26 of the disc 5, Figs. 3 and 4 respectively, are used to crushed grains; while the plane surfaces 15 and 26' of the same discs are used for pulverizing. The roughened surface 12 of the disc 4 and the rubber ring 24 attached to the disc 5 are used for husking rice. That is, by facing together the toothed surfaces of the discs 4 and 5, this mill will grind for flour; and, by facing together the roughened surface of the disc 4 and the rubber ring of the disc 5, this mill will husk rice.

About the support 9, Figs. 1 and 2, the fan house 30 is rigidly attached. Connected rigidly to the fan house 30 is the spout 31 bored thru the support 9, thru which the air driven by the blower 32 passes, which air separates the clean rice from its loose husks and bran. A cover 33 that covers the fan house 30 carries a column 34 which supports the air fan shaft 35, as shown, said cover 33 is attached to the fan-house 30 by bolts 36 and 37 and adjusting nuts 38 and 39, thru lugs 40, 41 and 42, 43 provided rigidly to each rim of fan house 30 and cover 33, respectively. A hole 43' is provided at the center bottom of the fan house 30 for the reception of the lower extremity of the shaft 35.

The shaft 35 has a keyway 44 at its upper end for the key provided on the bevel gear 45, and a ball socket and a ball-bearing at its lowest extremity, as indicated by 46, in order to reduce friction in this part of the mill in

grinding. The blower 32 is pinned to the shaft 35 and of course rotates with it when it rotates.

The bevel gear 45 is keyed to the shaft 35, as explained previously, and kept in place by set-screw 47, so that when it is desired to stop the function of the blower 32, when grinding for flour, said set-screw 47 is loosened and the bevel gear 45 shifted down. The bevel gear 48 that transmits motion to the bevel gear 45, is keyed to the shaft 6 and is kept in place by the hub 49 of the handle 8, which hub 49 in turn, is kept in place by adjusting nut 50 that is working on the threaded portion 51 of the shaft 6, as shown.

The sorting apparatus, Figs. 1 and 2, into which the mixture of rice with its loose husks and bran fall for separating the clean rice from the said loose husks and bran, consists of hood 52 which receives the mixture aforesaid, and the cylinder 53, the latter being opened at both ends, as shown. The cylinder 53 has an opening at its top (laid horizontally), as indicated by 54, thru which the mixture mentioned above pass for sorting, and another opening 55 at the bottom, thru which the clean rice free from husks and bran pass thru, while the husks and bran, pass out of this sorting apparatus thru the opened end 56 of the cylinder 53. The hood 52 and horizontal cylinder 53 are connected together rigidly, and is attached to the mill proper by the spout 31 telescopically, and is held in such a position by set-screw 57, as shown. In this way, this sorting apparatus can be attached or detached at will of the operator to meet requirements in grinding for various kinds of grain.

In the operation of this mill for husking rice purposes, the roughened surface of the disc 4 and the rubber surface of the disc 5, Figs. 3 (c) and 4 (a), respectively, are faced together, bevel gear 45 is thrown in mesh with bevel gear 48, and the sorting apparatus mentioned in the last paragraph attached to the mill proper, as shown in the drawing. After loading unhusked rice into the hopper 1, the handle 8 is revolved. The rice then is conveyed by the screw-feeder 3 out of the barrel 2 into and between the discs 4 and 5, as indicated by "x", wherein, the rice is husked, by the action of the rubbing surfaces

of the discs 4 and 5 just mentioned. The mixture of clean or husked rice, bran and loose husks then falls into the hood 52, thence thru the opening 54 and into the cylinder 53, wherein, by the action of the air driven in by the blower 32 separates the clean rice from the loose husks and bran, the clean rice drops directly thru the opening 55, as indicated by "y", while the husks and bran are blown out thru the opening 56 of the cylinder 53, as indicated by "z". When it is desired to grind for flour, the discs 4 and 5 are reversed, that is, facing the toothed faces of the discs together and the bevel gear 45 thrown out of mesh with the gear 48, to stop the fan or blower 32 from operating. The sorting apparatus may be left in place, or detached, as the operator may desire, by loosening the set-screw 57 and then said sorting apparatus (hood 52 and horizontal cylinder 53) pulled away.

It has been exhibited in this specification and the drawings that the principal new items added to a common hand-flour mill to make a new useful mill that will handle rice for husking and wheat for flour instead of designing a separate distinct mill—one for rice and one for wheat as at present—are the provision of roughened surface at the back of one of the discs and rubber surface to the other, together with a detachable sorting apparatus, which includes an adjustable blower fan. Also the provision of plane surfaces after the toothed surfaces to insure a fine product.

Having described and illustrated the main feature of this invention, I claim:

In a combination rice husker and flour mill, a rotor disk having a toothed surface on one face and a rubber surface on the other face, a cooperating stator disk having a toothed surface on one face and a roughened surface on the other face, means for reversably attaching the stator disk to the mill proper, means for driving the rotor disk, a hollow hub on the rotor disk adapted to reversably mount the rotor disk on said driving means and means for adjusting the distance between the two disks.

In testimony whereof, I affix my signature.

ALFREDO L. ROMERO.