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J. H. PENDLETON.

MACHINE FOR SCOURING GRAIN, &c.

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NO MODEL.

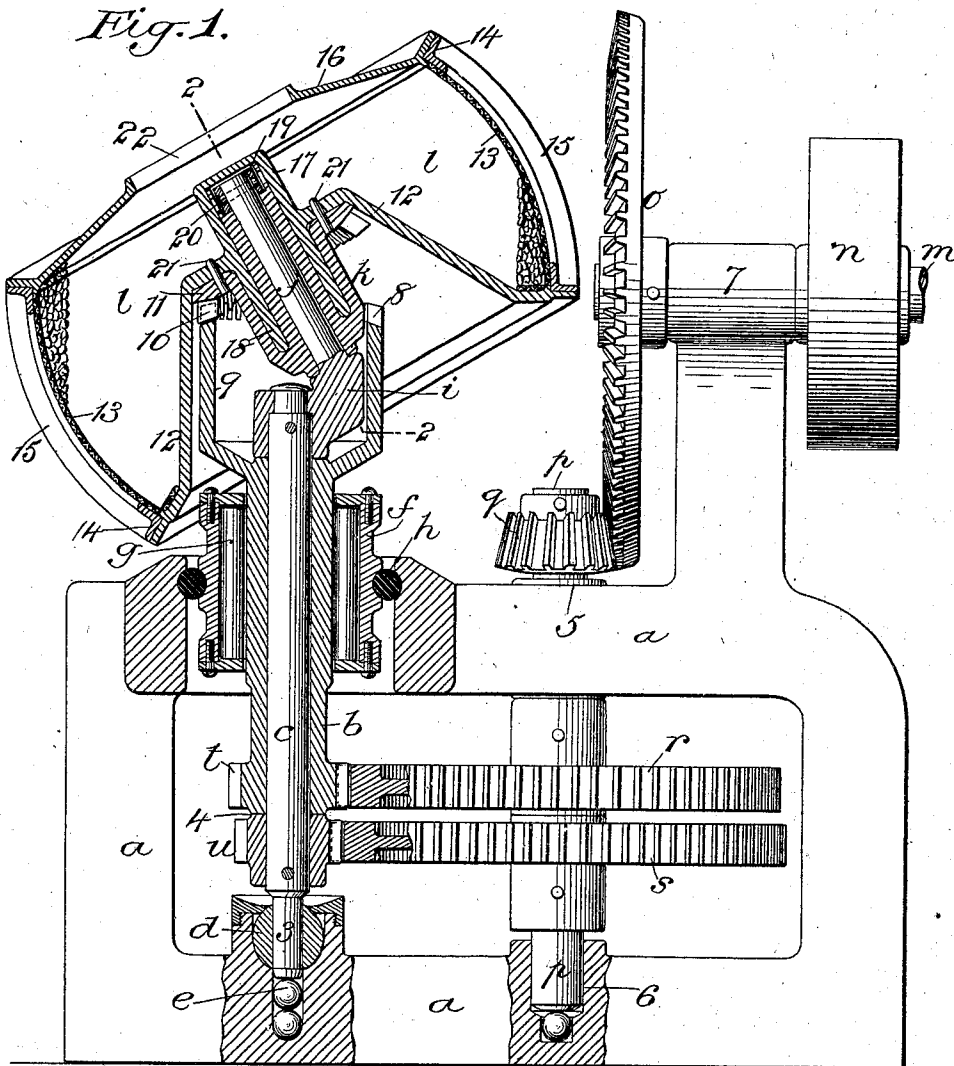
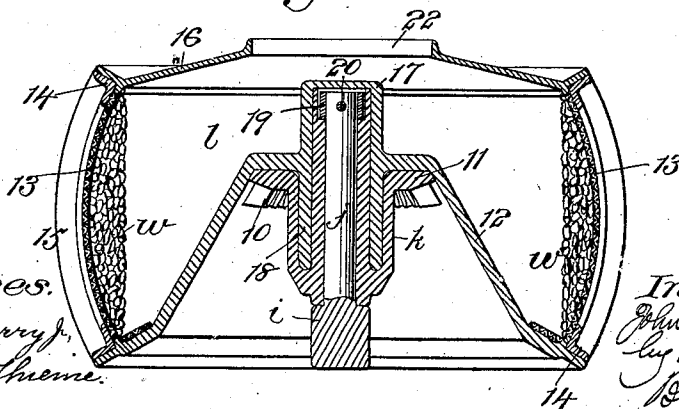


Fig. 2.



Witnesses.

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UNITED STATES PATENT OFFICE.

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MACHINE FOR SCOURING GRAIN, &c.

SPECIFICATION forming part of Letters Patent No. 721,649, dated February 24, 1903.

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To all whom it may concern:

Be it known that I, JOHN H. PENDLETON, a citizen of the United States, and a resident of Jamesburg, in the county of Middlesex and State of New Jersey, have invented a new and useful Improvement in Machines for Scouring Grain and other Matters, of which the following is a specification.

This invention relates to scouring-machines of the centrifugal type which may be employed for hulling rice, coffee, buckwheat, corn, or oats, pearling rice or barley, or otherwise scouring grain or seeds; and it consists in a certain organization of such a machine and certain combinations of its details, as hereinafter described and claimed, whereby a very efficient scouring action is obtained.

Figure 1 represents a central vertical sectional view of a machine embodying my invention; Fig. 2, a central section of what I call the "bowl" of the machine, taken transversely to Fig. 1 in the line 2 2.

a is a standing frame in which the several parts of the machine are supported.

b c are two upright shafts, of which *b* is hollow for the passage of *c* through it. The central shaft *c* has at its lower end a journal 3, which works in a spherical journal-box *d*, fitted to the lower part of the frame *a*, and the said shaft has its bottom supported on a ball step-bearing *e*. The hollow shaft *b* is supported on a shoulder 4, provided, as hereinafter described, on the shaft *c*, and above this support it works in a roller-bearing *f g*, which is located in an opening in the framing *a*, the box *f* of said bearing, which contains the rollers *g*, being surrounded with a ring *h*, of rubber, which is received partly within a groove in the exterior of said box *f* and partly within an annular groove in the framing. On the upper end of the central shaft *c* there is affixed a crank *i*, from which there projects upward obliquely at an angle of thirty degrees or thereabout to the common axis of the shafts *b c* a pivot or crank-wrist *j*, to which there is fitted to turn freely upon it a carrier *k*, in the form of a socket, for carrying the centrifugal receiver, (designated as a whole by *l* and hereinafter referred to as a "bowl.")

m is a horizontal main shaft which works in a bearing 7 at the top of the framing *a* and may be driven by any suitable means—for example, by a belt running upon its pulley *n* and which carries a bevel-gear *o*, gearing with and driving an upright shaft *p* through a bevel-gear *q* on the latter. The said shaft *p* works in fixed bearings at 5 and 6 in the framing *a* and carries two spur-gears *r* and *s*, which gear, respectively, with a spur-gear *t* on the shaft *b* and a spur-gear *u* on the shaft *c* for the purpose of driving these two shafts in the same direction, but at different velocities, the said spur-gears being represented as so proportioned that the shaft *c* runs faster than *b*—for example, that *c* may make ten revolutions for nine of *b*. The top of the gear *u* is represented as constituting the shoulder 4, before mentioned, for the support of the shaft *b*. Between the bowl-carrier *k* and the shaft *b* there is what may be termed a "universal coupling," represented as consisting of gear-teeth 8 on the upper edge of an open clutch-box 9, formed on or affixed to the upper end of said shaft *b*, and teeth 10, formed on the under side of a flange 11 around the upper part of the bowl-carrier.

The bowl *l* is represented as having an internally-conical or outwardly-concave bottom 12, forming an overlap-cover to the carrier *k* and clutch-box 9, and as having its sides or profile of the form of portions of a sphere the center of which is the point of intersection of the axes of the shaft *c* and the crank-wrist or oblique pivot *j*, the conical form of the bottom permitting this center to be brought down to this point. The sides 13 may be formed of or lined with any scouring or polishing material. In the example represented they are of wire-cloth distended between a lower ring 14, which is fastened to the bottom 12, and an upper ring 14, which is connected with the lower one by side braces 15. The upper ring 14 carries a cover 16, which has a central opening 22 for the feeding in the grains, seeds, or matters to be scoured. The conical bottom 12 has an upward projection in the form of a cap 17, which fits over and incloses the upper end of the pivot *j* and

has also a downward tubular projection 18, which fits into an annular cavity in the socket of the carrier *k*, and by these means dust is excluded from the pivot *j* and carrier. The carrier *k* is held down on the pivot *j* by a collar 19, placed on the upper end of the latter over the top of the carrier, and a pin 20, inserted through said collar and the pivot *j*. The bowl is attached to the carrier, so as to rotate therewith, by means of one or more dowel-pins 21, fastened in the flange 11 of the carrier and entering holes in the bottom of the bowl. This attachment provides for the lifting off of the bowl from the carrier for the purpose of emptying it.

The operation of the machine is as follows: Rotary motion being given to the shaft *m* and through it to the shaft *p*, and thereby to the shafts *b c* at unusual velocities, the bowl *l* is caused by the shaft *c* to revolve horizontally therewith about the vertical axes of *b* and *c*, while it is also caused by the shaft *b* to rotate about the oblique axis of the pivot *j*; but as the shafts *b c* both rotate in the same direction the velocity of the bowl upon the oblique axis is only equal to the difference in the velocity between *b* and *c*—that is to say, if *b* makes nine rotations to ten of *c* the bowl will rotate once on its pivot *j* for every ten rotations of *c*. In this way every side of the bowl is in turn brought both to the highest and lowest position. The grain, seed, or matter to be scoured being fed into the bowl through the opening 22, the compound horizontal and oblique revolution and rotation of the bowl above described causes said matter to be subjected not only to the centrifugal action around and upon the sides of the bowl, but also to a constant upward and downward movement thereon, so that all the grains or particles of the matter are constantly undergoing very active changes of position with respect to each other and to the bowl, and every grain or particle is in turn brought into contact with the scouring-surface 13, and hence a very active scouring is obtained on all parts of the surface of every grain or particle. In this operation, though the particles of the matter are undergoing such constant changes of position, its mass *w* will be caused by the centrifugal force developed in it to spread itself vertically, or nearly so, against the sides of the bowl, as indicated in Figs. 1 and 2. When the matter has been sufficiently scoured, the bowl is lifted off the carrier and may be emptied of its contents, which may afterward be subjected to any screening or separating process for the purpose of separating the offscourings from the scoured grains or particles.

In case the scouring sides 13 are made of reticulated fabric, as wire-cloth, the offscourings, if they are in the form of powder or very fine, may wholly or in part pass off through the said fabric.

It is obviously immaterial which of the shafts *b c* should have the higher velocity, it

only being necessary that their velocities should be different to produce the rotation of the bowl upon the pivot *j*.

I do not limit my invention to any material or fabric for the sides of the bowl. They may be formed of or lined with any known or suitable material of any degree of roughness or hardness or softness, according to the nature of the material to be hulled, scoured, or polished.

What I claim as my invention is—

1. In a scouring-machine, the combination of a shaft, a pivot carried by said shaft and arranged obliquely thereto, a bowl having internal scouring or polishing surfaces and capable of turning about said pivot and means for simultaneously producing the rotation of said shaft and the rotation of the bowl on said pivot, substantially as herein described.

2. In a scouring-machine, the combination of a shaft, a crank on said shaft, a bowl having internal scouring or polishing surfaces and capable of turning about the wrist of said crank and means for simultaneously producing the rotation of said shaft and the rotation of the bowl on said wrist, substantially as herein described.

3. In a scouring-machine, the combination of a shaft, a pivot carried by said shaft and arranged obliquely thereto, a bowl having internal scouring or polishing surfaces and capable of turning about said pivot and means for simultaneously producing the rotation of said shaft and the rotation of the bowl on said pivot, substantially as herein described.

4. In a scouring-machine, the combination of a shaft, a pivot which is carried by said shaft and the axis of which is oblique to and intersects the axis of said shaft, a bowl capable of turning about said pivot and having internal scouring or polishing surfaces of the form of portions of a sphere whose center is at the intersection of the axis of the shaft and pivot, and means for simultaneously producing the rotation of the shaft and the rotation of the bowl on the pivot, substantially as herein described.

5. In a scouring-machine, the combination of two shafts having a common axis, a pivot arranged obliquely to said axis carried by one of said shafts, a bowl having internal scouring or polishing surfaces and capable of turning about said pivot, a coupling between the bowl and the other of said shafts, and means for rotating the two shafts at different velocities, substantially as herein described.

6. In a scouring-machine, the combination of a hollow upright shaft, a central shaft working within said hollow shaft, a pivot carried by said central shaft and having its axis oblique thereto, a bowl having internal scouring or polishing surfaces and capable of turning on said pivot, a coupling between said bowl and said hollow shaft, and means for rotating the two shafts at different velocities, substantially as herein described.

7. In a scouring-machine, the combination

of a hollow upright shaft and bearings therefor, a central shaft working within said hollow shaft, a pivot carried by said central shaft and having its axis oblique to said shaft, 5 a carrier fitted to turn on said pivot, a bowl having internal scouring or polishing surfaces and removably attached to said carrier, a coupling between said hollow shaft and carrier, and means for rotating the two shafts 10 at different velocities, substantially as herein described.

8. In a scouring-machine, the combination of a hollow upright shaft and bearings therefor, a central shaft working within said hollow shaft, a pivot carried by said central shaft and having its axis oblique to said shaft, 15 a carrier fitted to turn on said pivot, teeth provided on said hollow shaft and corresponding teeth on said carrier, a bowl having internal scouring or polishing surfaces and removably attached to said carrier, and means 20 for rotating the two shafts at different velocities, substantially as herein described.

9. In a scouring-machine, the combination 25 of a hollow upright shaft and bearings therefor, a central shaft working within said hollow shaft, a crank carried by said central shaft, a bowl having internal scouring or polishing surfaces and capable of turning about

the wrist of said crank, a third upright shaft, 30 gears of different diameter on said third shaft engaging with corresponding gears on said central and hollow shafts respectively, and means for giving rotary motion to said third shaft, substantially as herein described. 35

10. In a scouring-machine, the combination of a hollow upright shaft, a central shaft working within said hollow shaft, a crank on said central shaft having the axis of its wrist oblique to and intersecting the axis of said 40 hollow and central shafts, a bowl capable of turning about said wrist and having an externally concave bottom and scouring side surfaces of the form of portions of a sphere whose center is at the intersection of said 45 axis and within said concave bottom, a coupling between said bowl and said hollow shaft and means for simultaneously producing the rotation of the two shafts at different velocities, substantially as herein described. 50

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 19th day of April, 1901.

JOHN H. PENDLETON.

Witnesses:

FREDK. HAYNES,
HENRY THIEME.