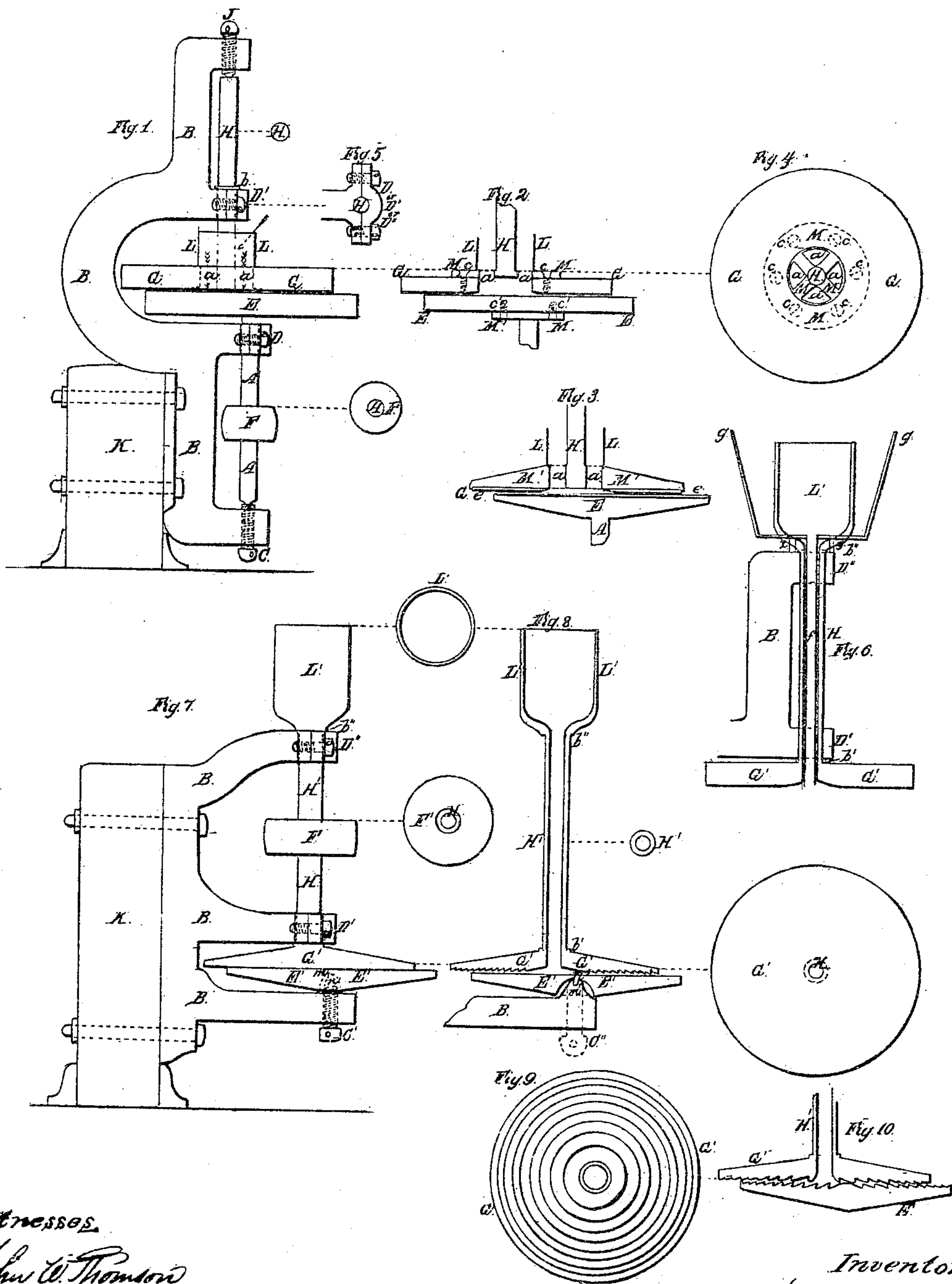


J BOGARDUS.
FLOUR MILL.

No. 2,194.

Patented July 29, 1841.



Witnesses,
John W. Thomson
Wm Wright

Inventor,
James Bogardus

UNITED STATES PATENT OFFICE.

JAMES BOGARDUS, OF NEW YORK, N. Y.

UNIVERSAL MILL FOR GRINDING, HULLING, &c.

Specification of Letters Patent No. 2,194, dated July 29, 1841.

To all whom it may concern:

Be it known that I, JAMES BOGARDUS, of the city, county, and State of New York, have invented certain new and useful improvements on Bogardus's patent universal mill, a part of which improvement is intended especially for the purpose of hulling rice and coffee and a part for grinding paints, drugs, and dyestuffs, but which improvements may also be applied to various other useful purposes herein set forth; and I do hereby declare that the following is a full and exact description of the same, reference being had to the drawings hereto annexed and to the letters and figures marked thereon, in which drawings—

Figure 1, represents a side view of an improved patent universal mill for the purpose of hulling and also for the purpose of grinding when desirable to detain the stones or plates at some definite distance apart; Figs. 2 and 3, vertical sections of convenient forms of constructing the hulling plates; Fig. 4, a horizontal view of the top of a hulling plate when the shaft is solid; Fig. 5, a similar view of one of the boxes; Fig. 6, a vertical section of a hollow shaft to be used as a substitute for the upper shaft in Fig. 1, showing also the separate feeding tube; Fig. 7, a side view of an improved patent universal mill with hollow shaft, showing a different manner of supporting the lower stone or plate; Fig. 8, a vertical section of certain parts represented in Fig. 7, and showing another different manner of supporting the lower stone or plate; Fig. 9, a view of the surface of one of the stones or plates when cut with grooves; and Fig. 10, a section of one of the stones or plates showing sections of the grooves aforesaid. There are besides six other figures, not numbered, which are horizontal circular sections.

The same letters in all the different figures refer to the same or similar parts.

The universal mill, invented and patented by the subscriber, having been several years in public use, needs not here to be minutely described. To the top of a shaft, supported in a suitable frame, is fixed the lower stone, which in this mill is termed the shaft stone, and on the said shaft is the pinion or whirl to which the motive power is to be applied. The upper stone "is to be placed on the top of the shaft stone, a little off the center," and "is secured by a screw or lever running into a pivot hole in a bridge made for that

purpose and placed firmly in the center of the upper stone." The said screw retains the upper stone in its proper position and communicates to it any desirable pressure. Instead of stone, metallic plates are in some cases used. The hopper is made as in common grist-mills. The subscriber has secured by patent "the manner of placing the upper stone off the center of the shaft stone."

To adapt the said patent universal mill to the purpose of shelling or hulling, I cover with sole leather or some other similarly elastic substance the interior surface of either, or (preferably) of both, of the stones or plates, fixing the said leather firmly thereon in any convenient way. To avoid grinding the seeds, the pressure of the upper stone or plate must be lessened by means of the aforesaid screw. The upper stone or plate, however, as above described, revolving on a point in its center, would be apt, the pressure of the aforesaid screw being removed, to become inclined toward the lower at one side, and to let the rice, &c., at the other pass unhulled from between them, to obviate this defect, the following construction has been devised. An upright shaft A, say eighteen inches long, and of suitable dimensions otherwise, is placed in a stout frame B; its lower end resting and revolving in a hole in the point of a screw C, and its upper end being supported by a box D through which it passes, to the said shaft, above the said box, the lower or motive circular hulling plate E is affixed, say eighteen inches in diameter, having a plane surface on the upper side exactly at right angles to the axes of the said shaft. On the said shaft is the pinion or wheel F to which the motive power is to be applied.

The diameter of the upper or friction hulling plate G is either equal to, or less than, the aforesaid lower or motive hulling plate, E; the centers of the said hulling plates are distant from each other, say two inches, more or less; and their interior or hulling sides are parallel, and distant from each other, say one twelfth of an inch, more or less, according to the size of the seeds which are to be hulled. To secure the upper plate G in the position aforesaid, I affix to its center a shaft H, say eighteen inches long, at right angles to its hulling side; which shaft, at the distance of say four inches, revolves in a box D', and has a shoulder b to prevent its falling lower: the

other extremity of the shaft rests, and revolves, on the point of a screw J. The aforesaid shafts, A and H, may be of less or of any greater length than that above set down; and it matters not in practice to which of the shafts the pinion or whirl F is attached—but, if attached to the upper shaft, the upper plate will become the motive and the lower the friction plate.

The frame may be a single upright piece of cast iron B, curved near the middle to allow the free action of the hulling plates, with an arm above and below them for the fixtures of the aforesaid boxes and at each extremity for the support of the aforesaid screws. The said frame is to be well secured to a post K which is firmly fixed to the floor, at such a height that one may conveniently turn the head of the lower screw C, and thereby contract or widen the distance between the hulling plates. The construction of the said frame work may be readily varied by any machinist.

The body of the hulling plates may be made of wood, metal, or stone; but, for hulling rice or other seeds, in order to preserve the hulled grains entire, I cover their interior or hulling sides with leather or with some equally elastic substance, or of some such elastic substance compose them altogether; wood, with its grain at right angles to the hulling side will answer; or, the hulling plates may consist of boxes filled with bristles, split whalebone, or other fibrous substances, set endwise, and compressed firmly together; or, most preferably, of boxes each filled with a tight spiral roll of alternate strips of leather and list—their hulling surfaces being cut to the form herein elsewhere defined. It is not always necessary that both the hulling plates should be composed of the same materials; and, in some cases, a stone or metal plate without the application of the said yielding surface, may serve the purpose of either one of them.

To feed this said hulling machine there are holes *a* in the upper plate around its shaft; and to the said plate, around the said holes, there is fastened a rim L, of convenient dimensions, to retain the seeds as they fall from a hopper in the manner of ordinary grist mills. To give facility to the rice, &c., passing between the hulling plates, the upper plate may conveniently have a concave surface at the center, extending a short distance around the aforesaid holes; and the rapidity of feeding may be increased to any desired extent by cutting circular grooves, hereinafter more minutely described, in the hulling surface of either one (but preferably of the upper), or of both, of the hulling plates—unless the hulling plates should be composed of the aforesaid spiral rolls of leather and list, in which case the list, being of a more yielding nature

than the leather, will produce substantially the same result. Fig. 2 represents a vertical section of a very convenient form of constructing the hulling plates. M is a circular plate of metal fitted to the end of the upper shaft H at right angles, in which are the holes *a* through which the rice &c., pass; this said plate M is fixed with screws *c* to the hulling plate G constructed as herein before described; and in the center of G there is a circular hole around the said holes *a* which are in the plate M around the shaft. A groove is turned in M, into which the aforesaid rim L, which may be made of sheet tin, is to be sprung. Fig. 3 represents the hulling plates in another convenient form. M' is a circular plate of metal, constructed as in Fig. 2, but of equal diameter with G; it is simply faced with leather *e*, which is made fast either with screws or with cement. From the above statements, other forms, equally suitable, may be readily suggested.

After the motive power is applied, the friction plate will remain stationary until the rice or other substance be introduced by the feeder, when the consequent rubbing or friction will cause it to revolve; and, each plate turning on its own axis, eccentrically with respect to one another, there will be communicated to the object of friction a peculiar and complex motion (already made public in my patent universal mill) which will effect the hulling in a better and much more expeditious manner than by any other mode heretofore known to the subscriber. The hulled rice &c., will be collected into a box, as the flour &c., is, in my said patent universal mill, or in any other way, as taste may determine.

Besides hulling rice and other seeds of a similar character, the aforesaid hulling machine may be advantageously employed for breaking or crushing berries, nuts, or other substances, by constructing the hulling plates of a proper material, and widening them to a sufficient distance by the lower screw in the manner aforesaid,—which said variations any machinist or miller can readily determine. By the use of hulling plates, simply faced with leather, and having circular grooves cut into the surface of the upper, I have taken from the coffee berry both the outer and the inner husks with the most desirable perfection, at a single operation.

It is plain that the aforesaid hulling machine will work equally well, whatever be the direction of the shafts; but, if the shafts be horizontal, the feeding rim or box L, before described, will be separated from the hulling plate, furnished with a cover through which the shaft H will pass as close as may be, and fastened to the frame in any convenient way. As the upright position appears to me the most convenient, I need

not more minutely describe the variation of construction in other cases necessary, as it may be easily determined by any machinist. The shaft H to which the upper plate G is attached, instead of being solid, may with advantage be a metal tube, a section of which is represented in Fig. 6, say one-fourth of an inch thick, and two inches in diameter, more or less. In this case, there will be no holes *a* nor feeding rim L in the plate around the tube; and instead of the screw J, Fig. 1, there will be a box D' through which the hollow shaft H' will pass; the seeds will pass down through the said tube or hollow shaft, the hopper L' being fixed to its top above the said box D'. *b'* and *b''* are shoulders to retain the hollow shaft in its proper position. It is also contemplated by the subscriber to introduce the aforesaid construction of the aforesaid hulling machine, which he calls the "universal huller," either with or without the aforesaid hollow shaft, as an "improved universal mill" for all the purposes to which his patent universal mill is applicable. In this case, stones or plates of metal will be used, instead of the aforesaid hulling plates.

It may be well here to remark, that when the nature of the substance to be ground or hulled is such that the speed employed will, by its centrifugal force, prevent or retard the said substance from passing down the aforesaid hollow shaft as rapidly as it should, this objection will be effectually remedied by placing within and separate from the said hollow shaft, a tube reaching to or near its bottom and extending to any convenient distance above it, which tube may be made of sheet-tin, and to the top of it a hopper may be fastened of any desirable size and shape, instead of the hopper L' which will then become unnecessary. In Fig. 6, a section of this device is represented.

f is the detached tube, fastened to the hopper *g*; the hopper *g* being fixed in a proper position in any convenient way—say, fixed to the frame B, by the props *x* and *y*. The hopper L' is supposed to be removed and the shaft H' terminated by the shoulder *b''*.

Instead of the aforesaid shaft A, it is also contemplated to balance or support the lower stone or plate by the point of a screw C', Fig. 7, on which it will revolve; the extremity of the hole for the said point should be as near to its hulling or grinding surface as may with safety; the said point and hole are to be fitted to each other so that the lower stone or plate will yield in any direction, and have constantly an equal pressure, in all its parts, upon the surface of the upper stone or plate, whatever may be the variation from its proper position, namely, at right angles to the axis of its shaft. In this case, the pinion or whirl F will necessarily be attached to the upper

shaft; unless, as a substitute for the said screw C' there should be constructed a shaft as A in Fig. 1, but with the upper end above the box D pointed as the said screw C', Fig. 7. Should the said shaft be thus used, there will, of course, be a projecting arm fastened to its end to drive the said stone or plate by means of a point projecting downward from the said stone or plate, but not represented in the drawings, the manner of construction being well known and in public use in other mills.

In Fig. 8 is represented a section of the lower stone or plate, supported in another manner, but substantially the same—namely, by a point fixed in the center of the stone, projecting downward and revolving in a cup or hole, *m'*, made fast to the frame, or constructed in the point of a screw, as represented by the dotted lines—the object of which construction is the better to supply oil to the running point *n'*.

To accelerate the feeding, grooves may, with great advantage, be cut into the grinding surfaces of the stones or plates, as before mentioned in the case of the hulling plates; the grooves in each stone or plate should be circular and concentric with its circumference, as represented in Fig. 9. There should, in general, be some distance between the said grooves; and, it is plain, that, as the distance between the said grooves is greater or less, or, as the number of the grooves is greater or less, so is the extent of the hulling or grinding surface on each of the stones or plates, greater or less. Besides giving facility to the mere feeding, each edge of every groove will, in two different points at the same time, act exactly as a pair of shears on each edge of every groove which it intersects in the opposite stone or plate; for this purpose, a section of one of the grooves will be best in the form of a triangle, of which the open side being the base, the vertex will be inclined in one of the stones or plates toward the shaft, and in the other in an opposite direction—and of which, the shorter side will be perpendicular to the hulling or grinding surface, or slightly inclined in the same direction as the longer side, as represented in Fig. 10.

It is impossible (so numerous and so different are the substances to which these improved universal mills can be applied) to specify the best modes of constructing in each case the aforesaid grooves, whether with relation to their form, their capacity, their number, or the distances between them, but, in general, it will be found best to construct the inner grooves of such a size as to carry readily between the stones or plates the substance to be ground or hulled, and to diminish gradually the size of the remaining grooves as their distance from the center

increases. The mode represented in Fig. 10 is peculiarly applicable to the cutting and grinding of substances which are hard or tough, as minerals and woods, coffee, apples, 5 turnips, and similar fruits; and it is plain that, by supporting the stones or plates so that they may be separated to any required distance and still parallel to each other, as represented in Fig. 1, or in Fig. 1 with the 10 upper shaft as in Fig. 6, the aforesaid substances may not be ground, but come from the mills in pieces of any required size. When the substance is semi-liquid, as paints, 15 printers' ink, &c., the grooves in the lower plate should be dispensed with. The case of hulling has been heretofore set down. From the nature and object of the aforesaid grooves it is plain that in some cases a variation from the form or from the di- 20 rection in which they have been described, will act in a manner substantially the same; the case when the hulling plates are made of leather and list wound alternately together, as herein before described, is an in- 25 stance in which the grooves are spiral—the said grooves being in effect produced by the list being of a more yielding substance than the leather adjoining.

It needs hardly be mentioned that, though 30 the dimensions of the said improved universal mills have been herein before in some degree defined, their proportions may be either enlarged or diminished; and that the

manner of applying the motive power to the pinion or whirl F will be as in other mills 35 for similar purposes, and can be readily determined by any machinist.

I do not claim as my invention any of the separate parts of the aforesaid improvements on the patent universal mill, but— 40

I do claim as my invention and wish to secure by Letters Patent, in combination with the manner of placing the upper stone or plate a little off the center of the lower stone or plate (which I have already pat- 45 ented):

1. The construction and use of one or more circular grooves in either one, or in both, of the stones or plates, as herein before described, or in any other manner substan- 50 tially the same, to accelerate the feeding, and to produce, besides the hulling or grinding action, a cutting action like that of shears.

2. The combination of the upper shaft 55 with the upper stone or plate, in the manner herein before described or in any other manner substantially the same, to operate, in combination with other parts herein before described, for the purposes of 60 hulling seeds; grinding drugs, paints, dye-stuffs, bread-stuffs, &c., or cutting fruits, &c.

JAMES BOGARDUS.

Witnesses:

JOHN W. THOMSON,
WM. WRIGHT.