

(No Model.)

D. BUIST & E. G. SCHMIDT.
DECORTICATING MACHINE.

No. 551,526.

Patented Dec. 17, 1895.

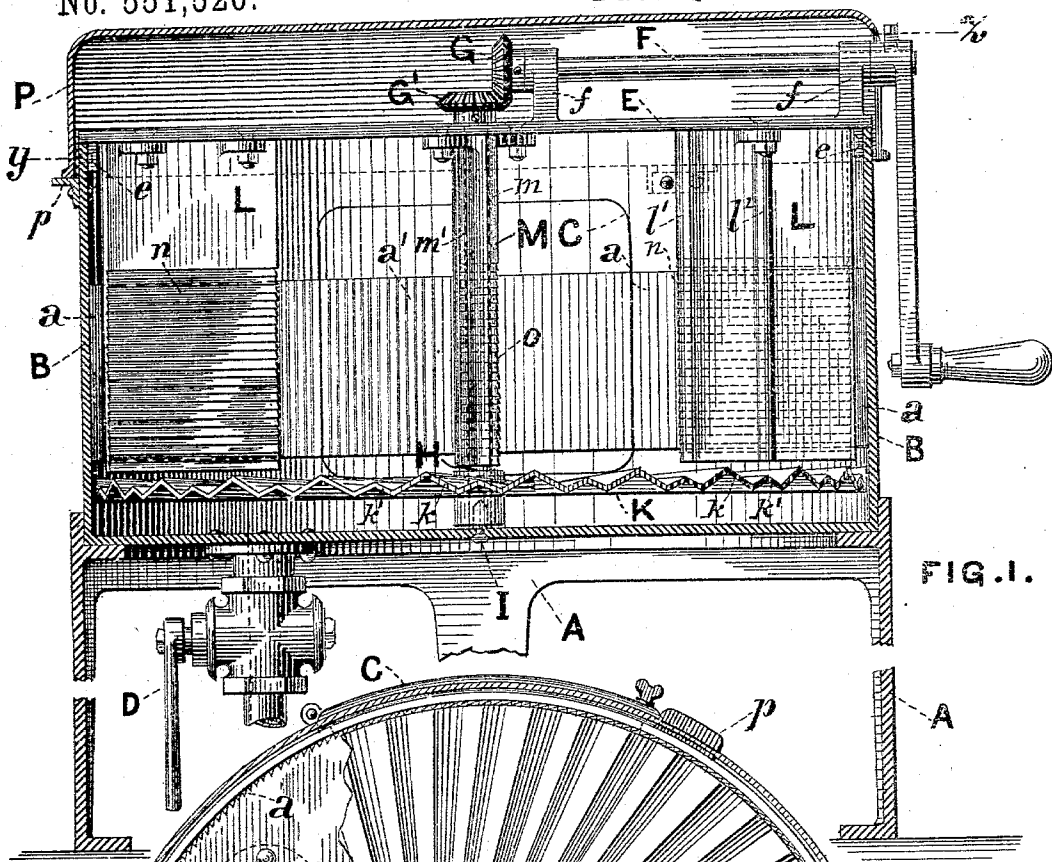


FIG. 1.

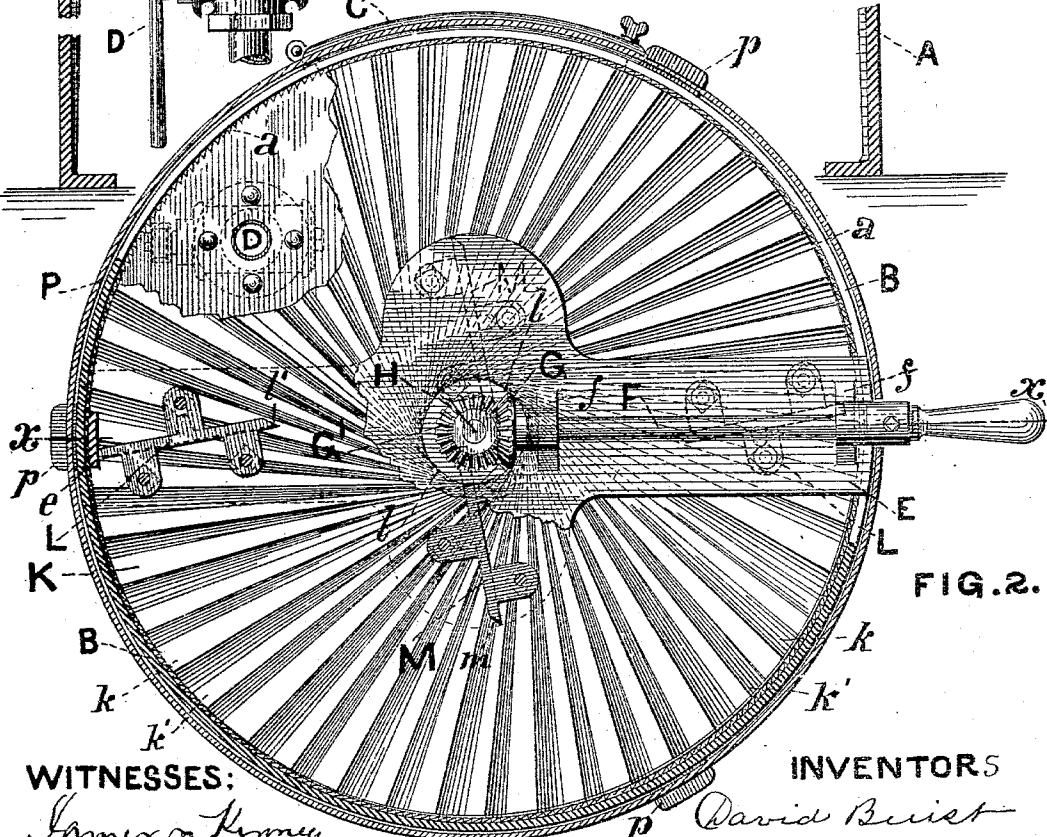


FIG. 2.

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DECORTICATING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 551,526, dated December 17, 1895.

Application filed April 19, 1895. Serial No. 546,352. (No model.)

To all whom it may concern:

Be it known that we, DAVID BUIST and EDWARD GODFRIED SCHMIDT, citizens of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a certain new and useful Decorticating-Machine, of which the following is an explicit and exact specification, enabling one skilled in the art to make and construct the same.

Our invention relates to that class of decorticating-machines in which roots or other vegetable products to be decorticated, skinned or peeled are placed, in suitable quantities, within a cylindrical tub having vertical corrugations on its interior periphery, corrugated abutments depending therein, and containing a horizontally-rotating disk, likewise corrugated on its upper face, the removal of the skin, rind or peel, being effected by means of continuous oscillations and the consequent attrition resulting therefrom, produced by the rotation of the said corrugated disk, the individual roots or vegetables of the material under treatment being agitated and brought in contact with the corrugated surfaces above mentioned and with each other, said rotation being imparted mechanically or otherwise to the said corrugated disk in the presence of water.

Heretofore devices for removing the peel or rind of a fruit or vegetable, mechanically, have consisted mainly of a rotating spindle and a fixed knife or knives, or vice versa, the mechanism admitting of the peeling of only one vegetable at a time, or where provision was made for the simultaneous peeling of a number of vegetables, the delicacy of structure and complication of parts, together with the waste attending their operation, has rendered the adoption of such devices undesirable, the difficulty of keeping them clean and in working order being an additional objection to their use. The object of our invention is to provide a vegetable decorticating or rind or peel removing machine of cheap and durable construction, which will obviate the waste of the vegetable itself, while completely freeing it from its outside covering, and to effect this upon a large quantity simultaneously, the refuse being removed and

carried away without appreciable trouble or loss of time, said machine to consist of few but solid elements, easy of access, readily cleansed and requiring no adjustment or sharpening, compact in form and being easily dismembered and packed for shipment or storage.

To these ends, our improvements consist in the employment of a cylindrical vessel or tub, standing vertically upon a suitable pedestal, said tub being provided with a removable cover or lid, and having a lateral water-tight door, for the removal of the material after decortication, and also a suitable valve in its bottom for flushing off the accumulated detritus and refuse when so desired.

The inner cylindrical face of the tub aforesaid is corrugated vertically, and resting on the top thereof is a bridge, which spans it centrally and serves as a means of support for depending rigid piers or plates disposed alternately near the periphery and adjacent to the center of the machine, radiating therefrom with a slight deviation from the true radiuses, to be hereinafter more fully set forth, said piers extending downward within the cylindrical tub to within clearing distance of a horizontally-rotating disk near the bottom of the said tub, and being corrugated on the side facing contrary to the direction of rotation, said corrugating being analogous in outline to that mentioned in connection with the inner periphery of the tub.

A horizontal shaft, journaled in bearings upon the bridge aforesaid, extends exteriorly of the tub for the attachment of a crank-handle or gear, and carrying at its inner extremity a miter-gear meshing with a horizontally-rotating mate immediately beneath it and concentric with the cylindrical tub.

A central vertical shaft rotating axially upon a pivot, rigidly secured to the bottom of the tub, is journaled at its upper end in the spanning-bridge and carries the driven miter-pinion last mentioned, to which it is keyed or otherwise secured and rotates with it.

An eccentrically-corrugated horizontal circular disk rigidly secured or keyed upon the lower end of the vertical shaft at a slight distance from the bottom of the tub—say, one inch, more or less—and of a diameter slightly

less than the latter, so that it can rotate freely therein and allow the flowing away of the refuse, skin, peel or rind after their removal from the root, fruit or vegetable, all as hereinafter more fully set forth.

The nature of our improvements and the manner in which they are to be carried out will be understood, reference being had to the accompanying drawings, in which—

Figure 1 is a vertical elevation, the pedestal, tub and cover being shown in section on the plane xx of Fig. 2. Fig. 2 is a plan view with portions broken away, the casing or tub and cover being shown in section on the planes y and z of Fig. 1.

Upon a pedestal A, of sufficient height to allow of the easy introduction and withdrawal of a draining-bucket beneath, rests a cylindrical tub B of dimensions suitable for the quantity of work to be done. The drawings represent a tub of two feet internal diameter, capable of working a one-half bushel of potatoes at a time, said half bushel occupying a space about three inches deep in the tub when uniformly spread therein. The interior periphery of the tub A is corrugated with vertical corrugations $a a$, and a water-tight door C may, when so desired, be provided in the side of the tub for the removal of the roots and vegetables after being decorticated; but this is merely an adjunct and forms no necessary part of our invention. When such is employed, however, the inner face of said door or gate must be corrugated with corrugations $a' a'$ in an analogous manner and to correspond with the corrugations $a a$ already mentioned. A valve D in the bottom of the tub affords facilities for flushing the same when so desired.

Resting upon the rim of the tub B and spanning the same is a bridge E, (shown in the elevation, Fig. 1, and partly broken away and in dotted lines, Fig. 2,) having lugs ee , for securing it firmly to the tub by means of screws or otherwise. The bridge E is also provided with standards ff , upon its upper face, affording bearings for the driving-shaft F. The latter carries on its outer end, keyed or set thereon, a crank, pulley, or gear, depending upon the method adopted for driving the machine, and on its inner end a bevel-gear G, preferably a miter, which meshes with a miter-pinion G', keyed or otherwise secured upon the vertical shaft H. We can dispense, however, with the shaft F and miter-gears G G', as we can extend the shaft H upward through the cover, terminating it with a square head, to which a removable crank can be readily applied. The shaft H finds an upper bearing in the body of the bridge E, which is centrally bored for its reception, and is stepped upon a gudgeon or pivot I, centrally screwed or riveted into the bottom of the tub B.

Keyed or securely fastened near the base of the shaft H, so that its lower side shall be about one inch, more or less, above the bottom of the tub B is a circular disk K, (shown

in elevation, Fig. 1, and partly broken away, Fig. 2,) of a diameter slightly less than the interior diameter of tub B, so that it may rotate freely therein. The disk K presents corrugations $k k' k k'$ on its superior face, said corrugations or ridges being of unequal heights, one half $k k k k$, &c., being higher than the other half $k' k' k' k'$, &c., and being distributed alternately around the periphery of the disk K, and converging horizontally and eccentrically in the direction of the center—that is to say, they extend from the periphery of the disk K to the periphery of a smaller imaginary circle b on the plane of rotation of the disk, and are tangent thereto, said interior circle being, say, four inches in diameter or thereabout. This deviation from the true radius imparts an angular direction or pitch to the ridges and grooves of the disk K, said pitch being in the direction of rotation, which, in the present instance, is to the right.

A vertical transverse section of the disk, near the edge, presents a serrated appearance. The serrations having an obtuse apex of, say, about one hundred and twenty degrees, sloping equally in either direction. These apices are primarily sharpened to a sharp scraping-edge, and require no subsequent dressing.

Depending from the bridge E, and rigidly secured thereto, are abutments or piers L L and M M, which extend downwardly to within clearing distance of the scraping-edges of the rotating corrugated disk, the piers L L being placed near the periphery, at an angle to the radius equal to that of the corrugations upon the disk K, but in a contrary direction, and the piers M M being adjacent to the vertical shaft and in vertical planes at right angles to the planes of the piers L L.

The lower part of the piers L L and M M are corrugated on the side which faces opposite to the direction of rotation of the disk for about two-thirds of their height, more or less, with corrugations $n n$ and $o o$, extending the entire width of said piers and presenting a serrated appearance in transverse section. The inner and outer edges of the piers L L and M M respectively are beveled rearwardly after the manner of a plane chisel, as shown at $l' l'$ and $m m$.

The piers L L and M M are re-inforced at the back by means of ribs l'' and m' . They are preferably about one-fourth the diameter of the tub B in width; but these dimensions are not arbitrary and may be departed from without affecting the principle of the invention, as this point would depend chiefly upon the character of the product to be worked, the size of the individual tubers and their specific gravity as compared with water, the drawing representing a machine especially designed for removing the exterior cuticle from potatoes, that, indeed, being the use to which the invention will be mostly applied.

A circular lid P, resting upon suitable brackets $p p p$, projecting from the exterior of the tub, said lid being at one point of its

rim slotted, so as to straddle the hub of the driving-crank, pulley or gear, covers the entire machine and protects it from interference.

5 The operation of our machine is substantially as follows: The valve D, being previously closed by raising the lever to a horizontal position, and the lid P temporarily removed, the tubers to be decorticated are introduced at the top of the machine and distributed over the corrugated disk K. Water is then introduced until it covers the vegetables under treatment, when motion is imparted to the disk K through the vertical shaft H, gears G' G and horizontal shaft F, by means of the driving crank or pulley, the primary movement being in such direction as to cause the corrugated disk to rotate to the right, or with the hands of a watch. The rotating movement of the corrugated disk causes the corrugations with their scraping-edges to impinge upon the potatoes, for we will suppose that potatoes are being operated upon throughout this description. This impact would have a tendency to bruise and eventually to tear the body of the tubers, were it not for the buoyancy imparted to the entire mass by the presence of the water surrounding them. The specific gravity of potatoes averaging about 1.3, the tendency is to throw the tubers outwardly, and by reason of the angle of the corrugations from the normal or radial line, due to their tangency to the inner circle b, together with the angular position of the abutting wings or piers near the periphery, also the corrugations upon the interior cylindrical face of the tub B, the potatoes are operated on by forces in a variety of directions, which tend to impart to them a rotary motion, first upon their horizontal and secondly upon their vertical axes, together with a progressive movement in the direction of rotation of the corrugated disk. This progressive movement brings the potatoes in contact with the corrugated faces of the pendulous plates or piers and causes them to accumulate, while in a state of rapid agitation, against the said corrugations with a pressure sufficient to remove the pellicle at the points coming in contact with the scraping-edges. Eventually the pressure due to the accumulation of material against the piers overcomes the centrifugal force imparted to the entire mass by the rotary movement of the corrugated disk, and the superabundant material is dislodged by other potatoes and carried around the sharp edge of the pier till it strikes one of the piers adjacent to the central shaft and thence around the inner corrugated face of the tub B till it reaches the pier on the opposite side thereof, where the operation is repeated and so on *ad libitum*. Furthermore the difference in the height of the radiating corrugations upon the rotating disk imparts a reciprocating vertical movement to the potatoes while lying against the corrugated faces of the pendent piers and while emphasizing

the rotary movement of the tubers enables the scraping-edges of the corrugations to adapt themselves to the superficial irregularities of the vegetable and to remove the skin from portions which would be otherwise inaccessible. The piers adjacent to the center act in the same manner as those near the periphery of the machine, though in a lesser degree, their chief function being to diverge the potatoes toward the corrugated periphery of the tub, thus insuring the operation of the device upon every individual tuber equally. During this progress around the interior of the tub, and while in contact with the corrugated piers, the potatoes are continually in movement, being violently agitated and rotating in various directions around their individual center of gravity and coming in contact with each other and the corrugations of the machine. The attrition thus produced tends to free the potatoes of such loose fragments of skin as may have been previously partially detached by contact with the scraping-edges of the rotary disk or the serrated corrugations upon the peripheral and central abutting piers, or the inner periphery of the tub aforesaid, so that the skin is continually being removed from each individual tuber during the operation of the machine, and sinks to the bottom of the tub beneath the rotating disk. When necessary or desirable, the refuse matter above referred to is drained off by means of the valve D, and fresh water is introduced at the top, the valve being closed as at the beginning of the operation. When the process is completed and all the tubers have been freed of their outer covering, this water is tapped off and the potatoes are removed, either through the gate or door C, or by removing the cover P and tilting the contents of the tub into a suitable receptacle.

The main advantage derivable from the use of our machine, outside of the economy of time and labor, as it enables one man to do as much work in a few minutes as can be accomplished by half a dozen in several hours by the present methods, lies in the fact that the outer covering of a vegetable root, such as a potato, for instance, consists mainly of two skins, an outer and an inner one. The outer skin which comes in contact with the soil whence the tuber derives its growth, is that part of the covering which it is desirable to remove. Immediately beneath this outer covering is a second skin which corresponds, to a certain extent, with that covering of grain known as "bran." This pellicle is rich in nitrogen, and with that portion of the potato which lies immediately beneath it, say to a depth of half an inch, constitutes the most nutritious part of the vegetable. Our machine, in contradistinction to machines heretofore devised, removes the outer skin or bark with the territorial flavor and retains the inner skin. When so desired, however, if the object in view is to remove the entire cuticle, this can be effected either

by continuing the operation for a longer period or by accelerating the movement of the machine.

Devices depending upon knives for the removal of the skin from vegetables not only remove the entire skin, but also a portion of the vegetable proper, entailing a waste estimated by experts to amount frequently to twenty-five per cent. of the product. This factor of loss is totally eliminated when our machine is employed.

It will be observed from the construction of our device, that while of cheap manufacture, due regard has been had to strength of construction and solidity and permanency of parts, there are no springs to get out of order, no knives to sharpen nor any parts liable to get displaced or broken.

We are aware that machines or mechanical devices for skinning potatoes and other roots or vegetables have been heretofore designed and patented, and we do not broadly claim a machine for skinning or decorticating vegetables; but

What we do claim as our invention, and desire to secure by Letters Patent, is—

1. The combination, in a decorticating or vegetable machine, of a cylindrical tub B, provided on its inner cylindrical surface with vertical corrugations, a horizontally rotating corrugated disk K, corrugated with eccentrically radiating ridges varying alternately in height rotating therein and means for rotating the same, substantially as described and shown and for the purpose set forth.

2. The combination in a decorticating machine of a cylindrical tub B, depending corrugated piers L, L, supported from the rim of the tub B, a horizontally rotating corrugated disk K, corrugated with ridges alternately varying in height rotating therein and means for rotating the same, substantially as shown and described for the purpose set forth.

3. In a decorticating machine, the combination of a cylindrical tub B, provided on its inner periphery with vertical corrugations, corrugated piers L, L, supported from the rim of the tub B, an eccentrically corrugated disk K, rotating horizontally within the said tub B, and means for rotating the same, substantially as described and shown and for the purpose set forth.

4. The combination in a decorticating or vegetable peeling machine, of a cylindrical tub B, provided on its inner periphery with vertical corrugations, a transverse bridge E, depending corrugated piers L, L, and M, M, the eccentrically corrugated disk K, pivot I, vertical shaft H, and means for rotating the

same, substantially as described and shown and for the purpose set forth.

5. In a decorticating machine, the combination of a cylindrical tub B, discharge valve D, transverse bridge E, depending corrugated piers L, L,—M, M, the eccentrically corrugated rotating disk K, pivot I, shaft H, and means for rotating the same, substantially as described and shown, and for the purpose set forth.

6. In a decorticating machine, the combination of a cylindrical tub B, having its inner periphery vertically corrugated and provided with a valve D, at bottom, a lateral water tight door C, a transverse bridge E, depending corrugated piers L, L,—M, M, the eccentrically corrugated rotating disk K, centrally pivoted shaft H, and means for rotating the same substantially as described and shown and for the purpose set forth.

7. In a decorticating machine, the combination of an internally corrugated cylindrical tub B, discharge valve D, lateral door C, transverse bridge E, depending corrugated piers L, L,—M, M, secured thereto, an eccentrically corrugated and centrally pivoted rotating disk K, the vertical shaft H, miter gears G', G, horizontal shaft F, supported on said bridge E, and means for rotating the said shaft F, substantially as described and shown and for the purpose set forth.

8. In a decorticating machine, the combination of an internally corrugated cylindrical tub B, discharge valve D, lateral door C, transverse bridge E, depending corrugated piers L, L,—M, M, an eccentrically corrugated rotating disk K, a vertical, centrally pivoted shaft H, miter gears G', G, horizontal shaft F, supported on bridge E, means for rotating the same, and a protecting cover P, substantially as described and shown and for the purpose set forth.

9. In a decorticating machine, the combination of an internally corrugated cylindrical tub B, having a discharge valve D, lateral door C, transverse bridge E, depending piers L, L,—M, M, an eccentrically corrugated, rotating disk K, a vertical centrally pivoted shaft H, miter gears G', G, horizontal shaft F, means for rotating the same, a protecting cover P, and a pedestal A, substantially as described and shown and for the purpose set forth.

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