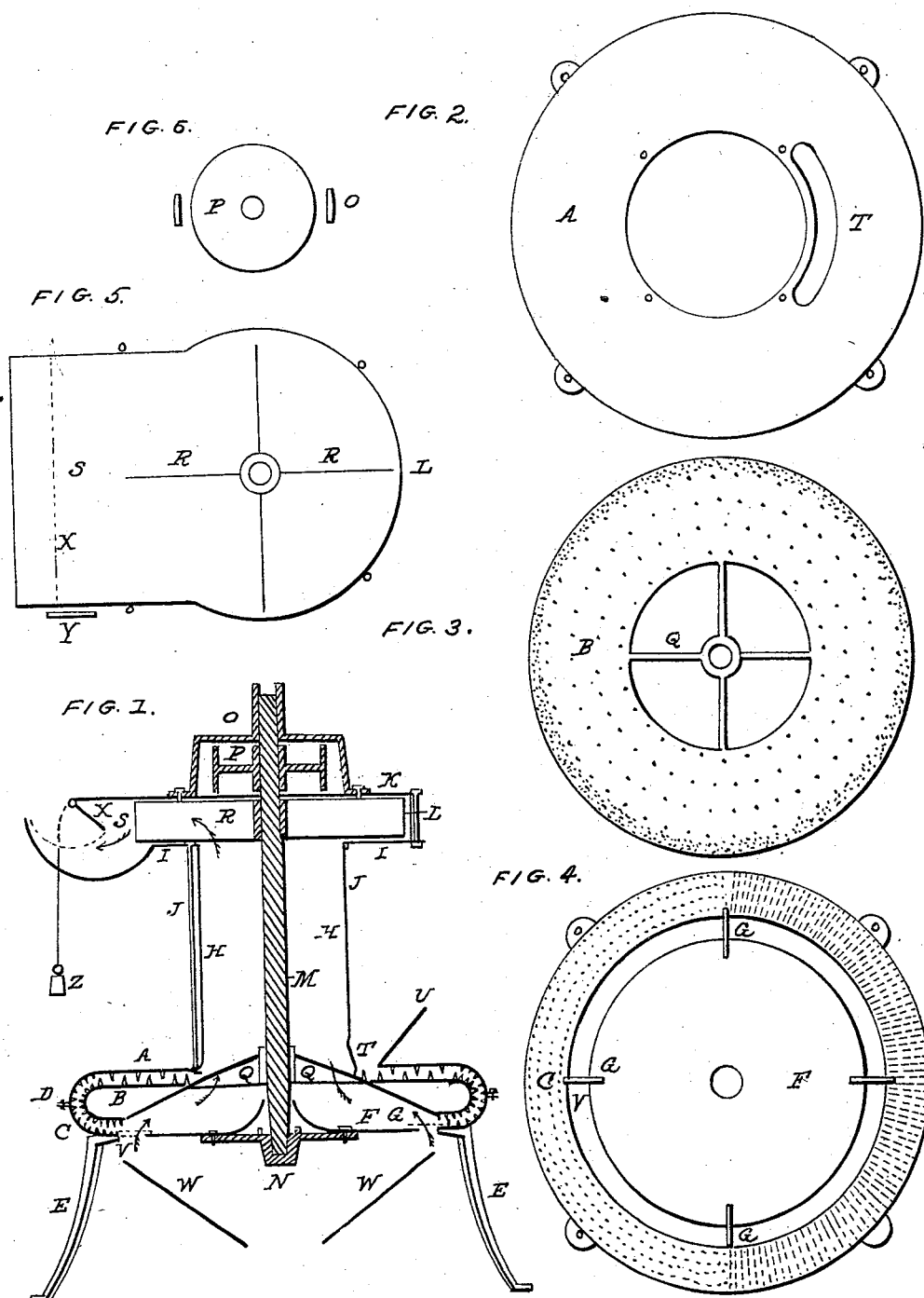


W. C. GRIMES.

Clover Huller.

No. 1,996.

Patented March 3, 1841.



UNITED STATES PATENT OFFICE.

WILLIAM C. GRIMES, OF YORK, PENNSYLVANIA.

MACHINE FOR HULLING AND CLEANING CLOVER-SEED.

Specification of Letters Patent No. 1,996, dated March 3, 1841.

To all whom it may concern:

Be it known that I, WM. C. GRIMES, of York, in the county of York and State of Pennsylvania, have invented a new and useful Machine for Hulling Clover and other Seed; and the following is a full description thereof, reference being had to the drawing which accompanies and makes part of this specification.

Figure 1 represents a longitudinal and vertical section of the machine; Fig. 2, a top view of the hulling chamber or upper ring; Fig. 3, a top view of the runner or hulling ring; Fig. 4, a bird's-eye view of the inner and lower part of the hulling chamber, or lower ring and a concentric disk therewith connected; Fig. 5, a transverse section through the fan chamber; Fig. 6, a transverse section through the driving pulley.

Similar letters of reference denote similar parts in all the figures.

In the construction of machines for hulling clover seed, it has been a common practice to depend rather upon acute asperities to break the hulls, than upon a more permanent principle, or structure less affected by use; hence such machines have become speedily defective as they become worn; the seed passing through the machine in a current too thin or diffuse, for the rounded teeth or asperities to act with sufficient force upon the light and scattered pods or hulls to break them.

In my machine the hulling is effected while the chaff and seed (in a mass) is under a pressure produced by centrifugal force; thus the effective power of the machine is rapidly increased with its activity.

The machine as generally constructed consists of the following arrangement of its constituent parts.

Three broad and curved, or concave rings A, B, & C, are placed one above the other, with all their contiguous surfaces armed with teeth, points on ridges, which alternate in concentric rows or stand promiscuously over the surfaces. The central ring, B, is made to revolve while the others remain a fixed portion of the machine. The outer rings are so curved at their outer edges, or concave in their form, that when laid or joined together, a chamber is formed between them, of a depth sufficient to leave a space of about one inch between them and the central ring or runner.

A flanch or ears cast upon the outer edge of each ring A, and C, admit the insertion of screws, D, D, by which they are drawn firmly together; thus united they are supported upon feet, E, E, at any convenient height. A circular plate or disk, F, whose diameter is some two or three inches less than the central opening of the lower ring, is placed concentric therewith; the one being attached to the other by arms, G, G.

A cylinder, H, H, consisting of four or more staves, with an interior diameter just equal to the central opening in the ring A, is placed concentric, and perpendicularly thereon, and confined within a collar or fillet that rises around its base. A plate or ring I, with a collar or fillet upon its underside, to embrace and confine the top of the cylinder, is screwed down upon the same; the screw bolts, J, J, passing down into the ring A, thus uniting the whole firmly together; the central aperture of this plate or ring coincides in diameter, and with the interior of the cylinder.

A plate, K, with a high flanch, L, rising from its outer edge and whose exterior form and dimensions agree with the plate or ring I, is placed with its flanch thereon, and firmly secured to the same (see Fig. 1) thus forming a chamber of some inches in depth between them.

A central shaft M, rises vertically through the machine, having its lower bearing or step in the box N, and its upper bearing in a box that forms part of an iron fixture O, that rises over the driving pulley P, and is secured to the plate K. The runner or central ring B, is firmly connected to the said shaft by arms and socket, Q, Q.

Several wings or vanes R, R, are attached to a socket upon the central shaft, and radiate therefrom. These wings traverse the chamber formed by, and between the plates I and K, and are of a length and width suitable to the size of the chamber in which they revolve. About three-fourths of this chamber is enclosed by the flanch L, the remainder is left open for the escape of the air set in motion by the fans, R, R. At this point, the chamber is lengthened out into the form of a short spout or trunk S. A circular aperture T, in the upper ring A is surmounted by a hopper U, from which the seed passes into the hulling chamber.

Operation of the machine: The unhulled

seed being thrown into the hopper falls upon the inner portion of the runner or central ring; when, by the motion of the latter it is driven to the widest range of the chamber; here accumulating in density it is forced over or around the bilge or periphery of the runner; thence inward toward the center, but the same power—centrifugal force—which drove it from, tends to prevent its return toward the center; the greater radial breadth of seed above the runner, however, overbalances that below, thereby causing a flow of the chaff and seed over the inner edge of the lower ring, discharging into the annular opening V. Thus the seed and chaff passes through the machine in a mass more or less dense; and while passing over or around the periphery of the runner it is subjected to a severity of pressure, and attrition proportionate to the velocity of the latter. By this process the hulls or pods are broken by attrition among themselves as well as by the friction of the teeth upon them; hence the angular sharpness of the latter, is not a matter of very essential moment in the operation of the machine; and should it be desired to maintain these acute angles, those around the periphery of the runner—which are most efficient in hulling—are filed and sharpened with great facility.

To reduce the machine to the greatest compactness and simplicity; the fan or wind wheel is placed upon the same shaft with the runner or hulling ring, and draws by suction, a current of air in from below; the latter entering at the annular opening, V into which the seed and chaff are discharged as before mentioned; here the chaff and dust are arrested by the ascending current of air, and carried by it up through the central openings of the rings, B, and A, through the cylinder H, and discharged from the spout, S. The seed and heavy particles falling into a large funnel, W, W, beneath the machine.

To maintain a nearly uniform force in the current of air through the annular opening, notwithstanding a varied motion of the machine, a valve or door, X, is placed in the spout, S, which in turning in one direction contracts the aperture, owing to the position of the valve, or curvature given to the lower part of the spout. When the current of air—by any means—increases beyond the proper degree of force, the valve, X, begins to swing forward; contracting the aperture more and more as the current increases; and in this manner a nearly uniform current—at the requisite point—is maintained; an object of importance in winnowing this kind of seed. In order that the valve should offer a continued increased resistance, as it is swung around, an arm Y, of an involute form is fixed upon the shaft

or axis,—which passes through the side of the spout for that purpose—having a groove around its convex side in which winds a cord supporting a weight, Z. It will now be seen, that as the valve turns on its axis, the point of suspension to the weight is thrown farther and farther from the same, thus constantly increasing the leverage, and resistance.

The size of the machine may be greatly varied but with the rings A, and C, of about three feet in diameter, and the other parts having the proportions indicated in the drawings annexed; I think to be most convenient. The machine may, and ought, to consist principally of cast iron.

The particular (or flattened) form, given to the hulling chamber in this machine, is adapted as a matter of convenience, or rather necessity when combined with the peculiar winnowing apparatus herein before described. But when hulling the seed, is the only object sought, to be accomplished by the machine; the runner and hulling chamber may be in the form of a double cone, or oblate spheroid or sphere, or parts, sections, or portions of these or other form, whereby the necessary pressure is produced by centrifugal force; upon the principle described, and the object will be as fully attained as by the form herein adopted.

As the novelty in the mode of winnowing or separating the chaff from the seed, in this machine may not be fully apparent at first view, it may be proper to refer more particularly to those points which I believe to be features of novelty. The merely placing at the top of a cylinder or hulling chamber a fan wheel whose axis is parallel and concentric therewith, for the purpose of winnowing grain &c., by a current of air produced by suction thereby; I am fully aware is without novelty; as having previously obtained a patent for this arrangement of machinery. In my former machine (as in others since constructed) the air is made to circulate through the chamber or cylinder in which the hulling, beating or scouring is effected, while in this machine the case is quite otherwise, the air not passing through the hulling chamber, as the latter is densely filled with chaff and seed. And the small upright cylinder—into which the seed never enters—being merely an empty trunk or tube, for the conveyance of the air and chaff to the fan chamber, from whence it is expelled.

The separation of the chaff and seed in the annular opening at the base of the machine; the conveyance of the chaff and dust up through the eye or central opening of the runner; the placing the fan wheel at the top or end of an empty trunk or tube, and the drawing thereby the chaff and dust into the chamber of the same; are, as I

verily believe, individually as well as collectively, features of entire novelty and to these and these alone does my second claim refer.

5 Having thus fully shown and set forth the structure, principle, operation, and peculiar characteristics of my machine, I will add in conclusion that I do not mean to confine or limit myself to one particular form or modification of the hulling chamber, or of the
10 winnowing apparatus but intend—as before intimated—to change and vary the same, as convenience may require, so long as the principle of action; and the results obtained remain unchanged.
15

What I claim as new, and as my invention, and desire to receive by Letters Patent, is—

1. The mode of hulling clover or other seed, under a pressure produced by centrifugal force; after the manner and upon the
20 principle herein before set forth; that is to

say; the seed in the hull is passed through a hulling chamber, in which it first diverges, from, and then converges toward the center, centrifugal force subjecting the seed and
25 hull to a pressure, less or greater, according to the velocity of the wheel, spheroid, or runner, as it passes over or around the bilge or periphery of the same.

2. I claim the combination of the fan
30 with the hulling wheel or ring, and operating after the manner, or upon the principle before specified.

3. I claim the mode of regulating or maintaining a nearly uniform current of air
35 through the machine, by means of a valve or door, operating after the manner or upon the principle hereinbefore set forth.

WM. C. GRIMES.

Witnesses:

JACOB GLESSNER,
HENRY GINTER.