W. F. PUMPHREY.

Grain-Separators.

No. 158,122. Patented Dec. 22, 1874.

Fig: 1.

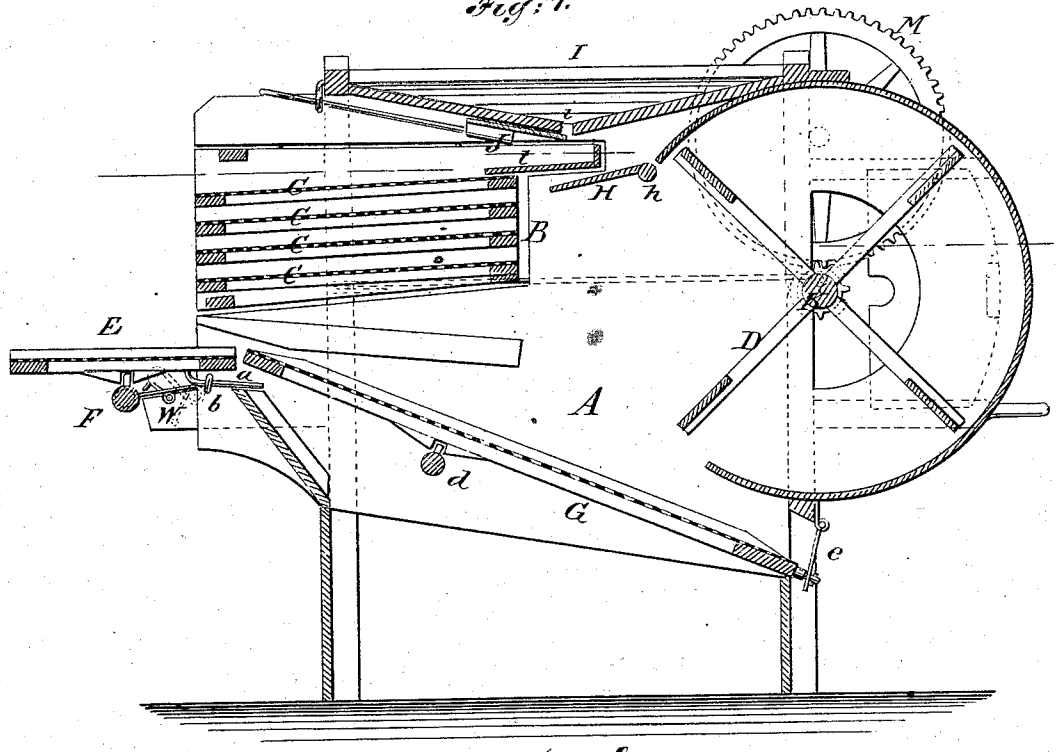
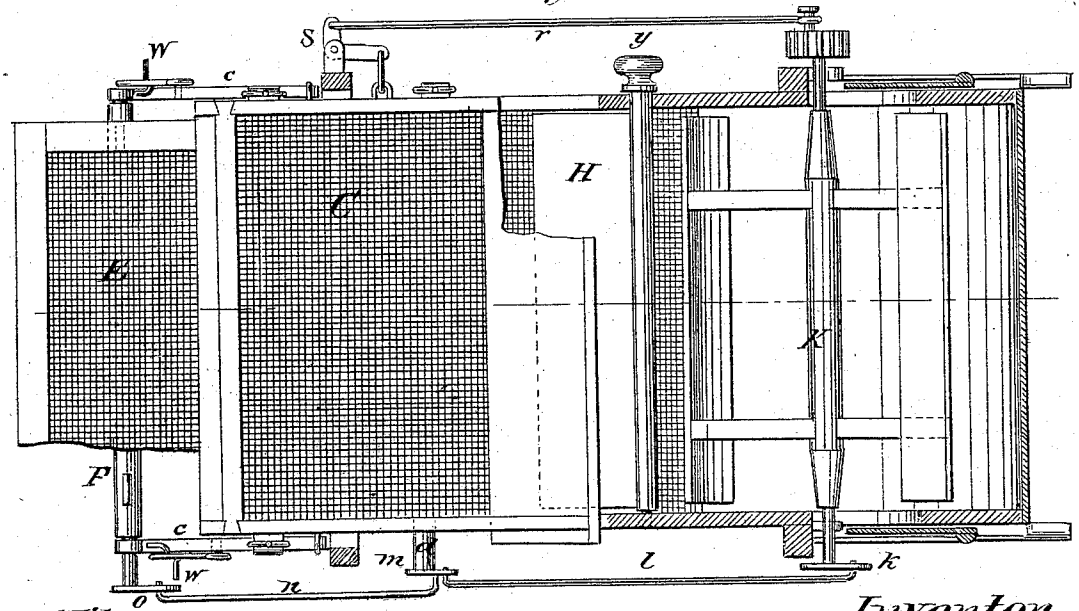


Fig: 2.



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WILLIAM F. PUMPHREY, OF FAIRFIELD, IOWA.

IMPROVEMENT IN GRAIN-SEPARATORS.

Specification forming part of Letters Patent No. **158,122**, dated December 22, 1874; application filed November 10, 1874.

To all whom it may concern:

Be it known that I, WILLIAM F. PUMPHREY, of Fairfield, in the county of Jefferson and State of Iowa, have invented a new and Improved Winnowing-Machine; and that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings and to the letters of reference marked thereon, making a part of this specification.

This invention is in the nature of an improvement in winnowing-machines, particularly such as are used for fanning seeds of various kinds; and consists of a winnower provided with a tailings-screen whose throw is adjusted independently of the riddles; also, the combination of a tailings-screen thus constructed with the seed-screen, nest of riddles, and fan, as hereinafter specified.

In the accompanying sheet of drawings, Figure 1 is a longitudinal section of my winnower; and Fig. 2, a plan or top view, partly in section.

Similar letters of reference indicate like parts in the two figures.

A represents a winnowing-machine or fan-mill, provided with the ordinary vibrating shoe B, containing the nest of riddles C, and also containing the fan D, which may be operated by hand or any other desirable power. Immediately below the vibrating shoe B and the screens therein, and projecting at right angles from the front of the case of the mill, is affixed a screen, E. The inner side of this screen is secured to the sides of the fan-case by a pin, *a*, and eyes *b*, and it is supported on a rock-shaft, F, the rock-shaft being secured to adjustable bearings *c*. Within the case of the machine, and inclined downwardly from the rear edge of the screen E, is the main or seed screen G. This screen is supported by a rock-shaft, *d*, on its under side, and its rear end is held in position by adjustable straps *e*. Within the case of the machine, and immediately in front of the fan D, and in line with the uppermost of the riddles C, is a damper-plate, H. This plate is secured to a shaft, *h*, which extends through the sides of the machine, and by means of which the damper-plate may be turned at any desired angle. Working in suitable guides below the hopper I is a sliding plate, J. This plate is so arranged that, by sliding it in or out, the throat *i* of the hopper may be more or less closed. That the screens E and G may have motion imparted to them which shall be independent of the motion imparted to the screens C in the vibrating shoe B, such motion is imparted to them by means of a crank-arm, *k*, secured to one end of the fan-shaft K, from which crank a connecting-rod, *l*, extends to a crank-arm, *m*, affixed to the rock-shaft *d*, and thence, by a connecting-rod, *n*, to a crank-arm, *o*, secured to the end of the rock-shaft F. The crank-arms *k* and *o* have one or more holes in them.

My winnowing-machine being constructed substantially as above described, its operation is as follows: The fan D being set in motion by means of the gear-wheel M, or in any other desirable way, motion is imparted from its shaft K to the shoe B by means of the connecting-rod *r* and bell-crank *s*, as in other winnowing-machines or fan-mills, so that as the fan is revolved the shoe B, with the screens therein, has a vibratory motion imparted to it. The seeds, being now introduced through the hopper I, fall upon the chute *t* in the shoe B, and thence onto the uppermost of the riddles C, through all of these riddles in succession, and, finally, onto the seed-screen G, the chaff and tailings being carried out of the mouth of the machine, and the most of the seeds gravitating through the screen G to the bottom of the same.

The foregoing description up to this point does not differ materially from that of any ordinary fan-mill; but, as is well known, not only does the blast from the fan blow out the chaff, but also quite a large percentage of the seeds with the chaff, so that in order to save these seeds from the "tailings" it has been necessary to pass them again and again through the whole machine until the tailings were comparatively free from seeds. To obviate this loss of time, and, to a great extent, save loss from waste, I affix to the mouth or front end of the fan-mill, immediately below the vibrating shoe B, a supplementary screen, E. This screen is secured to the fan-mill by pins *a* and staples *b*, and it rests upon a rock shaft, F, as described heretofore, so that as motion is imparted to the shaft K of the fan a vi-

brating motion is imparted to the screen E by means of the crank-arms *k m o* and connecting-rods *l* and *n;* and this motion, it will be observed, is entirely independent of any motion that is communicated to the shoe B by the connecting-rod *r* and bell-crank *s*. And as the screen E is vibrated a vibrating motion is also imparted to the seed-screen G by means of the crank-arms *k* and *m*, which, through the connecting-rod *l*, cause the rock-shaft *d* to have a rocking motion, which latter motion is imparted to said screen G. As the screen E is agitated the pins *a* reciprocate within the staples *b*, and thereby act as guides or steady-pins, while at the same time supporting the rear side of the screen to the fan-mill; and as the screen G is agitated, the straps *e*, which are hinged, enable it to have a reciprocating motion. The screen E may be adjusted to any desirable angle by the levers *w w*, which, by their action, force up or down the adjustable bearings *c*. Now, as the chaff or tailings is blown by the action of the fan from under the riddles C it is caught upon the screen E, which, projecting, as it does, from the outside of the fan-mill, receives the blast of the fan with less force than those within, so that the tailings, when falling upon it, have sufficient time to allow the seeds to gravitate through the screen, and at the same time they are sufficiently under the influence of the fan to cause the chaff to be blown away, so that, as a matter of fact, the tailings will not contain any appreciable quantity of seed, and hence need not be worked over.

The screen E, and also the screen G, may have a quicker motion imparted to them than is imparted to the screen C in the shoe B, by simply changing the point at which the connecting-rods *l* and *n* are attached to the crank-arms *k* and *o*, in this way increasing or lessening the "throw" of the screens; the shorter the throw the quicker the motion, and vice versa.

The advantage of this adjustable motion independent of the riddles of the shoe is, that it causes the seeds to pass a greater number of times over the surfaces of the screens, and practically, thereby, increasing the screens' surfaces, and does away with a second vibrating shoe with its nest of riddles.

Since some seeds will gravitate down the sloping screen G faster than others, the hinged supports *e* are constructed with a series of holes in them, into which the end bearings of the screen may be inserted, and thereby increase or lessen the angle of inclination at pleasure.

It is oftentimes desirable to direct the blast from the fan under one or more of the several screens in the vibrating shoe B, depending, of course, upon the nature of the seed being winnowed. To effect this I insert a damper-plate, H, as before described, within the fan-box, so that by turning the knob *y*, attached to the shaft *h*, this damper may be directed at any angle it is desired, conveying the blast of air under any one or more of the riddles C in the vibrating shoe B.

By adjusting the sliding slat or cut-off J in its bearings under the hopper the throat *i* of the hopper is more or less closed, thus regulating the feed of seed to the riddles.

From the foregoing description of the construction and operation of my winnowing-machine it will be seen that not only are the tailings freed from valuable seeds by the same operation of the machine, and at the same time that they are undergoing the ordinary screening process, but that, by imparting an independent motion to the seed or final screen, the seeds are more thoroughly screened than could be done without the interposition of a series of additional screens and increase of power in working the machine.

It may be mentioned here that if it is desired, as when working the very heaviest seeds, the supplementary screen E may be unshipped without disturbing the other working parts of the mechanism.

It is obvious that the tailings-screen hereinbefore mentioned may be advantageously attached to thrashing-machines, separators of all kinds, and clover-hullers with the same useful result as in the ordinary fan-mill. I do not, therefore, wish to limit myself in the application of this screen to fan-mills only, but to any analogous machine with fan or blast of air.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a winnower, the tailings-screen having its throw adjustable independently of that of the riddles, substantially as described.

2. In a winnower, the combination of the independently-moved tailings-screen E, the seed-screen G, riddles C, and fan, substantially as and for the purpose described.

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