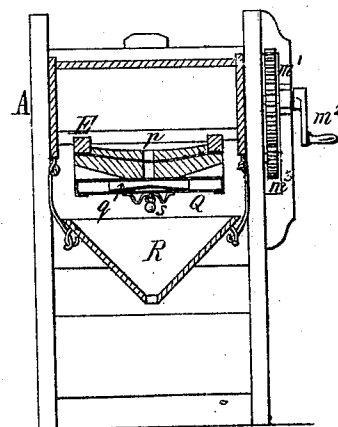
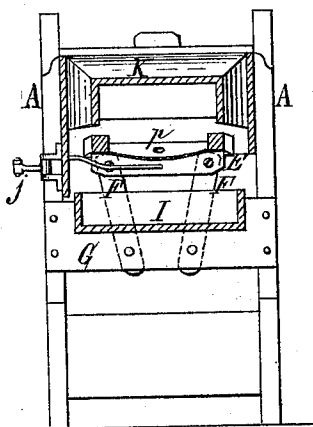
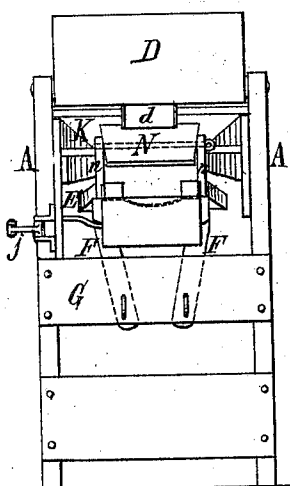
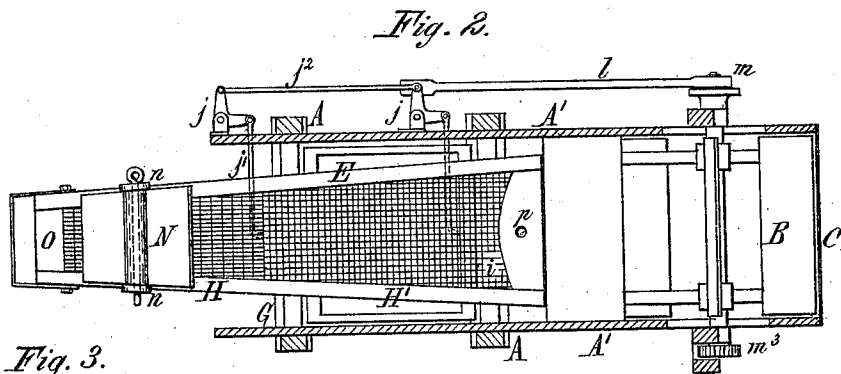
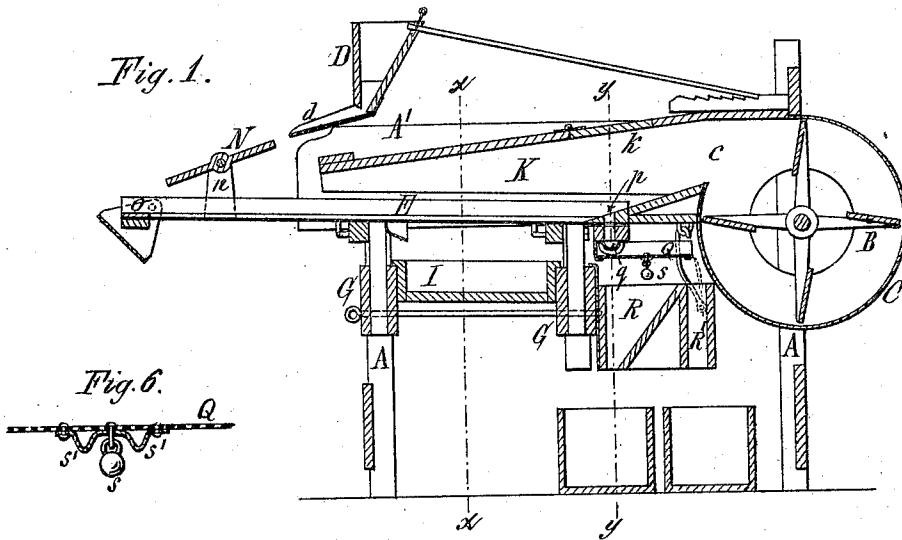


H. B. STEVENS.
GRAIN-SEPARATOR.

No. 172,672.

Patented Jan. 25, 1876.



Edward Wilhelm
Ed. Buckheit. } Witnesses

Henry B. Stevens, Inventor
By Jay Byatt, atty.

UNITED STATES PATENT OFFICE.

HENRY B. STEVENS, OF BUFFALO, NEW YORK, ASSIGNOR TO GEORGE L. SQUIER, OF SAME PLACE.

IMPROVEMENT IN GRAIN-SEPARATORS.

Specification forming part of Letters Patent No. **172,672**, dated January 25, 1876; application filed December 12, 1875.

To all whom it may concern:

Be it known that I, HENRY B. STEVENS, of the city of Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Machines for Separating Coffee and other grains and seeds, which improvements are fully set forth in the following specification, reference being had to the accompanying drawing.

The general construction of my present machine is, in many respects, similar to that of my improved machine for separating rice and other grains and seeds, for which Letters Patent of the United States, No. 144,803, were granted to me November 18, 1873.

My present improved machine is more especially designed for separating coffee; and it consists, principally, of a fan and a table, provided with a wire-cloth surface, having two sizes and kinds of mesh in the wire-cloth, said table being inclined slightly upward from the mouth of the fan, and having a lateral vibratory or oscillating motion, whereby the coffee, which is fed on the table near its upper end, is separated into two portions, the unhulled grains working to the surface and edges of the mass on the table, and are carried over the upper end thereof by the air-current, while the hulled grains are carried by gravity down the center of the surface of the table, and delivered through an opening at the lower end of the table, where one or more vibratory riddles are arranged to separate the hulled grains into two or more sizes. The lighter and larger chaff is in the meantime blown off by the air-current passing over the table, while the finer chaff and dust are riddled through the fine meshes of the upper portion of the table and fall to the ground, and the broken and small grains of coffee are riddled through the larger meshes of the lower portion of the table and fall into a receptacle provided for that purpose.

In the accompanying drawing, Figure 1 is a longitudinal section of my improved machine. Fig. 2 is a horizontal section, showing a plan of the table. Fig. 3 is an end view of the machine. Figs. 4 and 5 are cross-sections, respectively, in lines *xx* and *yy*, Fig. 1. Fig. 6 is a detached view of the knocker attached to the screen.

Like letters of reference designate like parts in each of the figures.

A is the frame of the machine; B, the rotary fan; C, the fan-case; *c*, the mouth thereof; D, the feed-hopper, and *d* the spout thereof. E is the table, supported by four arms, F, pivoted at their upper ends to the under side of the table, and at their lower ends to cross-bars G of the frame. The table E is made tapering toward its upper or front end, as clearly shown in Fig. 2. The table is covered with two kinds of wire-cloth—that covering the upper or front portion H of the table having a long narrow mesh, which will retain all of the grains, and permit only the finer particles of chaff and dust to pass through, while that covering the lower or rear portion H' of the table has a square mesh, of the proper size to pass the broken or dead grains through while retaining the sound grains. The wire-cloth is attached to the table in such manner that its upper surface will be concave, so that the thickest mass of grain will be along the central line of the table, the mass of grain increasing in depth and width as it approaches the rear end of the table. The latter is operated by means of two bent levers, *jj*, pivoted to the side boards A' of the frame, the inner arms of said levers being connected to the table by a rod, *j*¹, while their outer arms are connected by a rod, *j*², and operated by a pitman, *l*, connecting with a crank, *m*, on the end of the fan-shaft. A spur-wheel, *m*¹, (driven by a crank, *m*², when the machine is operated by hand,) gears with a pinion, *m*³, on the fan-shaft, by which the fan and connecting parts are actuated.

I is a drawer or receptacle, arranged underneath the portion H' of the wire-cloth surface for receiving the broken grains riddled through the same. *i* is a plate or bottom of sheet metal or wood, arranged under the rear end of the table for guiding any broken grains that may pass through that portion of the wire-cloth to the receptacle I. K is a deflecting-case or air-trunk, made open at the bottom, and arranged above the table E, so as to extend from the mouth of the fan to within a short distance from the point at which the grain is fed unto the table. The case K is made tapering ver-

tically as well as horizontally from the mouth of the fan toward its front end, so as to conform with the tapering form of the table, whereby the blast or air-current is better confined and directed upon the grain upon the table. A portion, *k*, of the case *K* is hinged, so that it can be opened for observing the operation of the machine.

N is a deflecting-board, arranged above the table, near the upper end thereof, for directing the air-current with more or less force upon the upper end of the table. The board *N* is pivoted between two standards, *n*, secured to the table *E*, so that the board vibrates with the table. *O* is a stop ledge or rib, constructed of leather, metal, or other suitable material and secured transversely to the upper or outer end of the table, so as to project slightly above the wire-cloth surface thereof, whereby the passage of the unhulled grains over the tail end of the table is retarded, and a certain amount of grain retained at that end of the table. *p* is an opening or aperture formed in the center of the table at its rear end, for discharging the hulled grains. *Q* is a screen or riddle, arranged under the discharge-opening *p* of the table, and securely attached to the latter, so as to vibrate therewith. The meshes of this screen are of such size as to permit the smallest and poorest of the hulled grains of coffee to pass through into a hopper or receptacle, *R*, while the grains of larger size pass over the tail or end of this screen into another receptacle, *R'*. *q* is a deflecting spout or plate, made inclined both ways from the center, and arranged on the riddle *Q* under the discharge-opening *p* of the table, so as to better distribute the grains over the entire width of the screen. *s* is a knocker attached to the under side of the screen *Q*, for preventing any grains from lodging in the meshes thereof. The knocker *s* is hung directly to the under side of the wire or other surface of the riddle, preferably between two projections, *s'* *s'*, also secured to the under side of the riddle, so that the vibrations of the latter cause the knocker *s* to strike the projections *s'*, thereby giving the riddle a sudden and severe jar laterally and upwardly, whereby the clogging of the riddle is effectually prevented.

By applying the jarring device directly to the wire-cloth of the riddle a more effectual jarring of the riddle is attained, while at the same time the knocking mechanism is enabled to be applied to those parts of the wire-cloth where it will be most efficient. Several knocking devices may be employed on the same riddle, if one should not be sufficient to keep the meshes clear.

In working my improved machine the uncleaned coffee is placed into the hopper *D*, which, being pivoted, is adjusted to the proper feed. The natural jar of the machine causes the coffee to be discharged from the hopper in a continuous stream, and in falling from the hopper to the table the coffee passes through the air-current, which separates and removes

from the coffee all of the lighter and larger chaff. The coffee is first received upon the upper portion *H* of the table, having a long narrow mesh, whereby the finer chaff and dust are separated from the coffee. The lower ends of the arms *E*, which support the table, being pivoted at a less distance from each other than the upper ends, a peculiar oscillating or rocking motion is imparted to the table, which, together with the concave form of the surface of the table, causes the coffee to form a longitudinal layer on the central portion of the table, which layer increases in width and depth as it advances toward the rear end of the table. The table is made tapering toward the upper end to conform to the shape of this layer of grain, and hold and control it in this shape the more easily, which is essential to the thorough separation.

The rough surface of the wire-cloth serves to agitate the coffee as the table oscillates, which causes the larger unhulled kernels to work to the top of the layer or mass of coffee, and from there gradually to the edges of the layer, where the air-current, operating with less obstruction, carries the unhulled grains up the table and over the upper end thereof, where the adjustable tail-board or shoe catches them and guides them into a proper receptacle, while the chaff and dust are blown over this shoe.

The stop *O* at the end of the table, in connection with the adjustable deflector *N*, are very essential to the perfect working of the machine, as by means of them the coffee can be held back until the unhulled grains all come to the surface and edges of the layer, and just the proper amount of blast can be directed on them to carry them over, without carrying over the hulled grains.

While the unhulled grains are being carried over the upper end of the table, as described, the smoother and smaller hulled grains are carried down the table against the air-current by the force of gravity, and as they pass over the lower section *H'* of the table, the broken and small dead grains are riddled through the coarser meshes of this part of the table, and fall into the drawer *I* below. The perfect coffee passes over and goes out through the discharge-aperture *p* in the extreme lower end of the table, and falls on the riddle attached to this end of the table, the smaller grains passing through the riddle into the receptacle *R*, while the larger grains pass over the riddle into the receptacle *R'*.

I claim as my invention—

1. In a grain-separator, the combination, with a fan or equivalent means for producing an air-current, of a vibrating screen, having meshes of two or more different sizes, and made inclined toward the fan so as to cause the unhulled and hulled grains to travel in opposite directions on the screen, and be discharged at opposite ends thereof, while the finer dust and chaff are sifted through one part of the screen, and the broken and dead

grains through another part thereof, simultaneously with the separation of the hulled grains from the unhulled ones, substantially as hereinbefore set forth.

2. The combination, with the fan C, of the vibrating screen E, made concave longitudinally so as to cause the layer of grain to be deepest in the longitudinal central line of the screen, and in line with the air-current, substantially as hereinbefore set forth.

3. The combination, with the fan C, of the vibrating concave screen E, made tapering from the fan toward its upper end, substantially as and for the purpose hereinbefore set forth.

4. The combination with the tapering vibrating table E, of the tapering deflecting case or air-trunk K, substantially as and for the purpose hereinbefore set forth.

5. The combination, with the fan C, air-trunk K, and table E, of the adjustable deflecting-board N, substantially as and for the purpose hereinbefore set forth.

6. The combination, with the fan C and vibrating table E, of the stop O, arranged at the upper end of the table for retarding the discharge of the unhulled grains, substantially as hereinbefore set forth.

7. The combination, with the fan C and vibrating table E, provided with discharge-opening *p*, of the screen Q, secured to the under side of the table so as to vibrate therewith, substantially as and for the purpose hereinbefore set forth.

8. The combination, with a vibrating screen, of one or more projections, *s'*, and one or more balls, *s*, attached to the under side of the screen for jarring the same, substantially as hereinbefore set forth.

HENRY B. STEVENS.

Witnesses:

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EDWARD WILHELM.