

(No Model.)

2 Sheets—Sheet 2.

G. S. GRAVES & J. HEEDE.

STARCH SEPARATOR.

No. 256,315.

Patented Apr. 11, 1882.

Fig. 6



Fig. 7

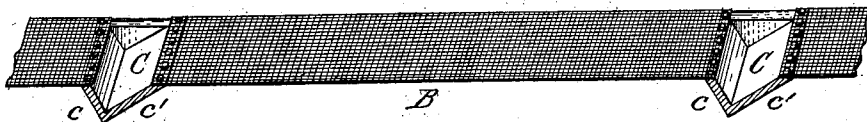
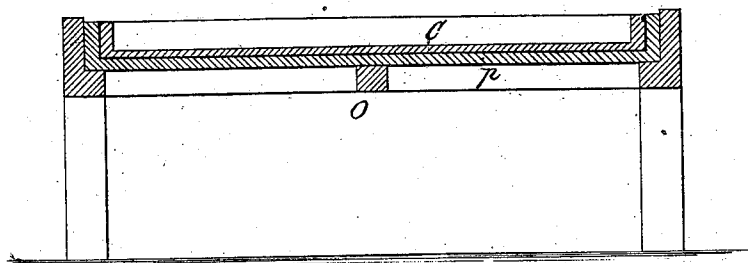


Fig. 8



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UNITED STATES PATENT OFFICE.

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STARCH-SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 256,315, dated April 11, 1882.

Application filed November 4, 1881. (No model.)

To all whom it may concern:

Be it known that we, GILBERT S. GRAVES, of the city of Buffalo, in the county of Erie and State of New York, and JACOB HEEDE, of Peoria, in the State of Illinois, have invented new and useful Improvements in Starch-Separators, of which the following is a specification.

This invention relates to certain improvements in that class of separators which are employed for separating the crude starch from the bran and other offal, and which consists essentially of a flat vibrating sieve.

The object of our invention is to so construct the sieve that the bolting-cloth is relieved from the wearing effect of the water sprays which are delivered upon the upper surface of the sieve for facilitating the separation of the starch from the bran, and also to cause the material flowing over the sieve to be distributed uniformly across the entire width of the sieve for effecting a thorough separation of the starch from the offal.

Our invention consists in that end of the peculiar construction of the sieve and connecting parts, as hereinafter fully set forth.

In the accompanying drawings, consisting of two sheets, Figure 1 is a side elevation of a starch-separator provided with our improvements; Fig. 2, a top plan view thereof with the water-pipes removed. Fig. 3 is a longitudinal section of the shaking-sieve and water-pipes. Fig. 4 is a longitudinal section on an enlarged scale of the head portion of the shaking-sieve. Fig. 5 is a fragmentary cross-section on an enlarged scale in line *x x*, Fig. 1. Fig. 6 is a longitudinal section, illustrating the means whereby the bolting-cloth is secured to the troughs of the frame. Fig. 7 is a perspective view of a portion of the bolting-surface. Fig. 8 is a cross-section of the frame by means of which the bolting-cloth is secured to the troughs of the sieve-frame.

Like letters of reference refer to like parts in the several figures.

A represents the rectangular sieve-frame, provided with corner-braces *a* and cross-pieces *a'*.

B represents the bolting-cloth, which is applied to the under side of the sieve-frame A in sections which are separated by transverse channels or troughs C. These troughs are

preferably constructed of wood, and are secured with their ends to the under side of the sieve-frame A, and the bolting-cloth is secured to the upper edges of these troughs and to the lower side of the main frame A, as clearly shown in the drawings. The sections of bolting-cloth are preferably supported between the channels C by cross-bars *d*, secured to the under side of the sieve-frame. The channels C are preferably made angular in cross-section, and have the side *c*, which is adjacent to the tail edge of the upper bolting-cloth section, made abrupt or steep, and the side *c'*, which is adjacent to the head of the next lower bolting-cloth section, less inclined, so that the material will discharge freely from the tail of each bolting-cloth section into the trough, and pass easily out of the trough upon the head of the next following section of bolting-cloth. *e* represents an opening extending across the bolting-cloth under the rear cross-bar, E, of the sieve-frame, for the discharge of the bran; and *e'* is a cross-bar connecting the side pieces of the sieve-frame at the rear ends thereof and supporting the rear edge of the last section of bolting-cloth.

F represents perforated water-pipes arranged transversely above the sieve-frame, over the troughs C thereof, and connected by pipes *f'* with the supply-pipe *f*², so that the sprays of water fall from the perforated pipes F directly upon the trough C, and not upon the bolting-cloth. The troughs C receive the impact of the falling water and relieve the bolting-cloth from the wear to which it would be subjected if the water fell directly upon the sieve. The pitman G connects with a staple, *g'*, attached to the sieve-frame, and the head portion of the latter is preferably provided with diagonal brace-rods *g*², in order to prevent the sieve-frame from springing or otherwise changing its form under the strain to which it is subjected by the actuating mechanism.

H represents four posts, which are suitably supported on the floor, and which carry on their upper ends rollers *i*, upon which the sieve-frame slides back and forth by means of guide-bars or plates *j*, which are secured to the sides of the sieve-frame, and which rest on these rollers. The sieve-frame is slightly inclined from the head toward the tail in the usual man-

ner. The rollers *i* are preferably grooved, and the plates *j* provided with ribs, which project into and run in the grooves of the rollers.

M represents the starch-receptacle, arranged underneath the sieve for the reception of the material which has passed through the meshes of the bolting-cloth; and *m* is a discharge-spout connected with the bottom of the receptacle *M*.

N is a conveyer-trough, arranged below the tail end of the sieve for the reception of the bran or coarse offal.

In order to facilitate the attachment of the several sections of bolting-cloth to the sieve-frame *A* and troughs *C*, we employ a frame or table, *O*, which is provided with depressions *p*, in which the troughs *C* are placed before they are attached to the sieve-frame, and in which they are held in the same relative position which they afterward occupy in the sieve. The troughs *C* are temporarily secured in the depressions of the table *O* by clamps or screws, and the sections of bolting-cloth are secured to the upper edges of the trough *C* by tacks, as represented in Figs. 6 and 7. The troughs are then released and removed from the table *O*, and the bolting-cloth and troughs are secured to the under side of the sieve-frame *A*, preferably by first securing the head edge of the first bolting-cloth section to the head of the sieve-frame, and then stretching and securing the cloth toward the tail of the sieve in an obvious manner, and finally applying the tail-bar *e'* to the frame *A* and securing the tail edge of the last bolting-cloth section thereto. The intermediate cross-pieces, *d*, are secured to the frame after the bolting-cloth is attached thereto, and their upper edges are preferably rounded to prevent their cutting the cloth. The bolting-cloth being secured to the frame *A* in sections enables a single section of bolting-cloth to be removed when worn or damaged and a new section of bolting-cloth substituted in its place without removing the remaining sections of bolting-cloth, whereby a great saving in the bolting-cloth is obtained.

The material is delivered upon the head portion of the sieve by a suitable feed-spout or feed-trough, which preferably extends across the width of the sieve to distribute the material uniformly over the sieve. The finer starchy portions of the material pass through the meshes of the bolting-cloth, and the bran and other coarse parts pass into the first trough, *C*, where they meet the water spray from the pipe *F*. The shaking motion of the sieve thoroughly mixes the water with the material contained in the trough, and causes the starchy portions to become detached from the bran and other coarse particles. The wet material contained in the trough is gradually propelled upon the next bolting-cloth section by the shaking motion of the sieve, when the water containing the starch is permitted to pass through the meshes of the bolting-cloth, while the coarse matter passes onward over the sieve until it falls into the next trough, *C*. The same operations are repeated in the sev-

eral troughs and on the several bolting-cloth sections until the material is finally discharged over the end of the sieve. The troughs *C* also serve to distribute the material uniformly over the entire width of the sieve.

In our improved sieve the material is presented to the bolting-surface in a thin layer of uniform thickness, and is repeatedly mixed with water and agitated, whereby a complete separation of the starch matter from the bran and offal is attained. The sieve receives a rectilinear sliding motion which is well adapted to effect the desired separation, and upon disconnecting the pitman *G* from the sieve-frame the latter is free to be taken off whenever this becomes necessary for the purpose of cleaning or renewing the bolting-cloth.

We do not claim the sliding bars attached to the sieve-frame and running on the supporting-rollers; but

We claim as our invention—

1. In a starch-separator, a sieve provided with transverse strips arranged underneath the water-pipes and adapted to receive the impact of the falling water, substantially as set forth.

2. In a starch-separator, a sieve composed of two or more sections of bolting-cloth and one or more intermediate troughs, in which the tailings of the first section are received and commingled, and from which the material is delivered on the head of the next following section, substantially as set forth.

3. In a starch-separator, the combination, with the sieve composed of two or more sections of bolting-cloth and one or more intermediate troughs or gutters, *C*, of spray-pipes *F*, arranged over the troughs *C*, substantially as and for the purpose set forth.

4. In a starch-separator, a sieve provided with one or more transverse troughs, *C*, made angular in cross-section, substantially as set forth.

5. In a starch-separator, a sieve provided with one or more transverse strips or troughs, *C*, and two or more sections of bolting-cloth secured to the under side of the sieve frame *A* and to the edges of the transverse strips, whereby a separate section of bolting-cloth can be removed without removing the remaining sections, substantially as set forth.

6. The combination, with the sieve-frame *A* and the trough or gutters *C*, secured to the under side thereof, of sections *B* of bolting-cloth, secured to the under side of the sieve-frame and the upper edges of the troughs *C*, substantially as set forth.

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NICHOLAS ULRICH,
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