No. 674,286. Patented May 14, 1901.

# R. A. STUBBS.

## BOLTING OR SEPARATING MACHINE.

(Application filed Sept. 28, 1900.)

(No Model.) 2 Sheets—Sheet 1.

*Fig. 1.*

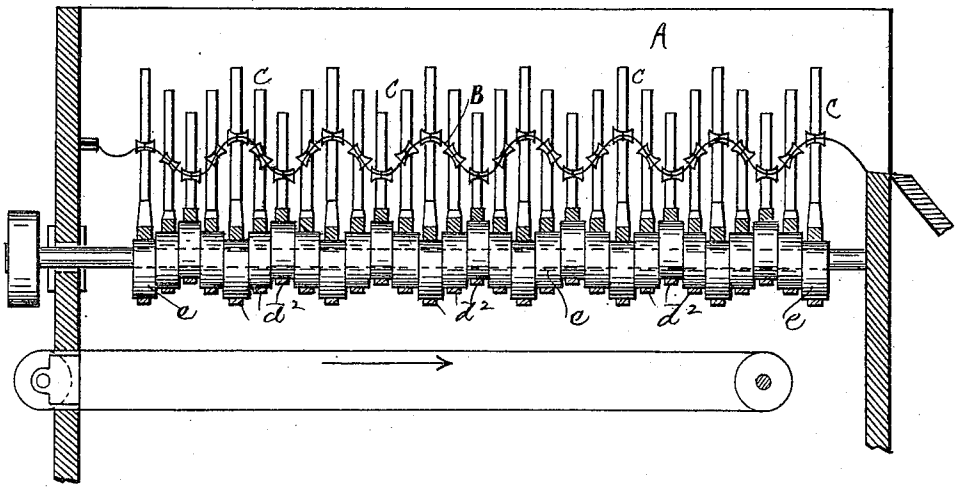
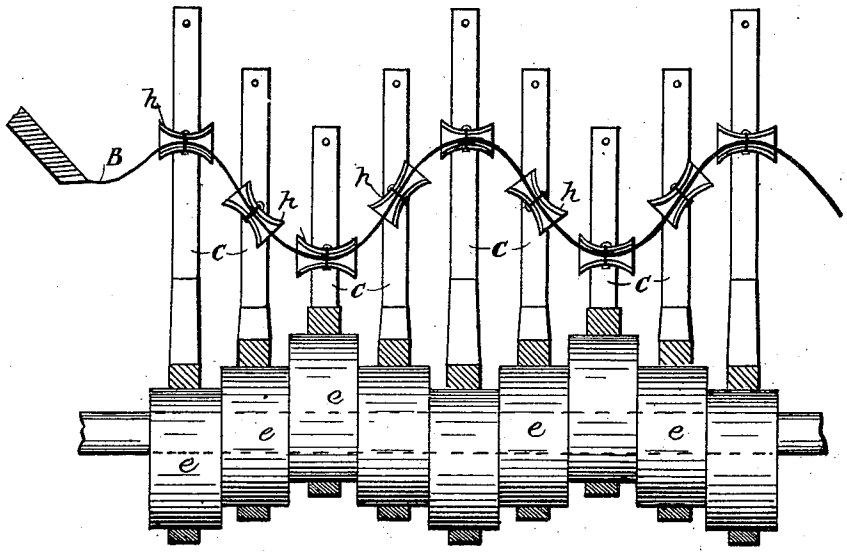



*Fig. 2.*




*Witnesses.*

Chas. Herbert Jones

Walter A. Knight.

*Inventor.*

Riley A. Stubbs,

by L. M. Knox

Att'y.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 674,286. Patented May 14, 1901.

R. A. STUBBS.

BOLTING OR SEPARATING MACHINE.

(Application filed Sept. 28, 1900.)

(No Model.) 2 Sheets—Sheet 2.

Fig. 3.

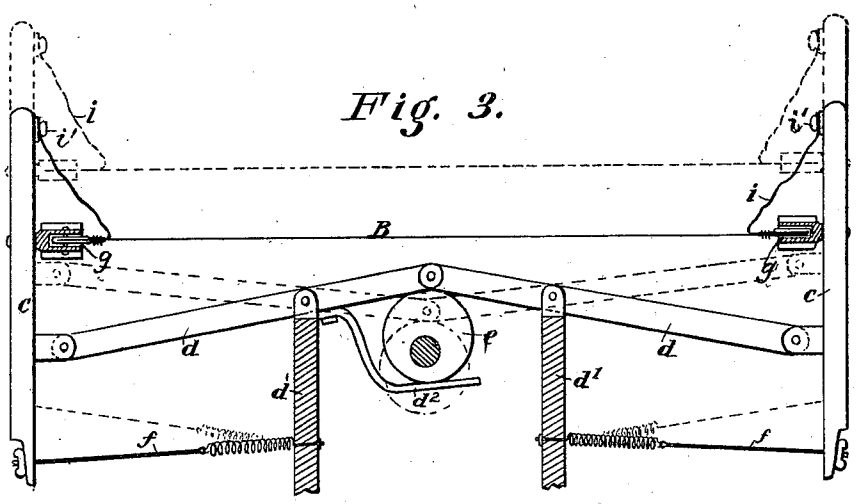



Fig. 4.

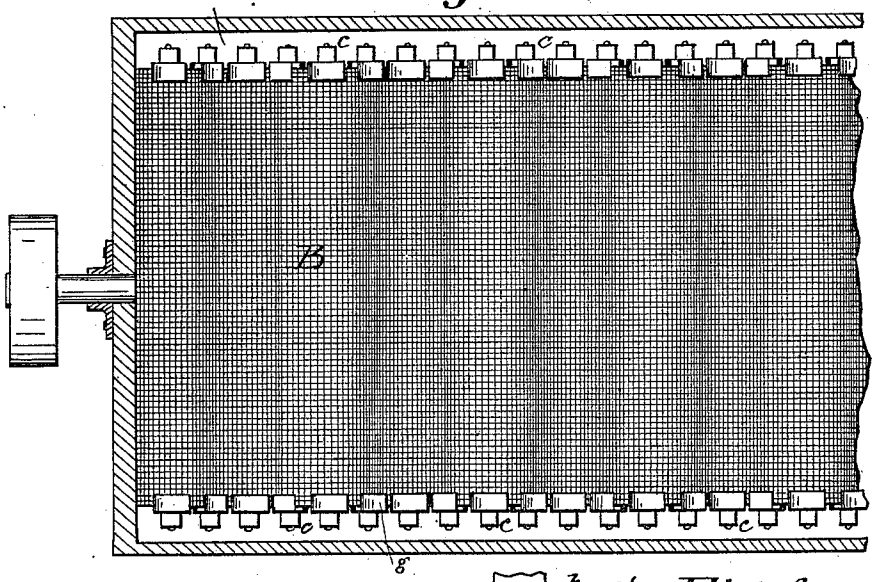



Fig. 5.

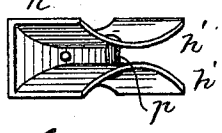
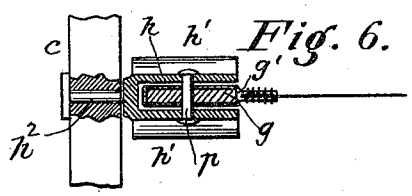



Fig. 6.




Witnesses.

Chas. Hubert Jones

Walter A. Knight

Inventor.

Riley A. Stubbs.

by L. M. Hosea

Atty

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

# UNITED STATES PATENT OFFICE.

RILEY A. STUBBS, OF DAYTON, OHIO.

## BOLTING OR SEPARATING MACHINE.

SPECIFICATION forming part of Letters Patent No. 674,286, dated May 14, 1901.

Application filed September 28, 1900. Serial No. 31,366. (No model.)

*To all whom it may concern:*

Be it known that I, RILEY A. STUBBS, a citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented new and useful Improvements in Bolting or Separating Machines, of which the following is a specification.

My invention relates to bolting-machines, its object being to provide a simple and effective mechanism for the complete separation of the constituents of the crushed grain as it comes from the reduction-rolls in high-grade milling processes, whereby the flour constituent is left entirely pure and free from fibrous particles of the husk and other elements deleterious to the desired color or condition of the flour to be produced.

In bolting-machines heretofore employed, and especially those in which a more or less violent reciprocatory motion is given the sieves, the crushed stock as it comes from the reduction-rolls is subjected to a mechanical action, which breaks up and pulverizes particles of bran and other foreign matter, which in consequence are passed through the meshes of the bolting-cloth with the finer material, and thus reduce the grade of the flour. To overcome this difficulty and to produce a more efficient sifting action, I have devised the hereinafter-described mechanism, in which a wave-like motion is imparted to an otherwise-fixed strip of bolting-cloth by producing rhythmical undulations of the same, following in regular succession one after another from end to end. This action gradually carries forward the larger particles of the stock by a gentle rolling movement, which allows the finer particles to fall through the meshes of the sieve without abrasion or comminution of the stock. One of the essential elements of this mechanism is a duplicate series of adjacent fingers holding opposite edges of the bolting-cloth in tension and arranged to reciprocate vertically in rhythmical succession, producing the desired movement without end motion of the bolting-cloth. The mechanism is of a simple character and few parts and is readily accessible for readjustment of tension, repairs, &c., and is, moreover, exceedingly conducive to the durability of the silk bolting-cloth employed.

My invention is illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation sectioned through one compartment of the machine containing my improvement; Fig. 2, a detail elevation, on an enlarged scale, of a number of the elevating-fingers, illustrating the manner of producing the undulatory curves in the bolting-cloth; Fig. 3, a cross-elevation showing the lever, operating connections of the elevating-fingers, and the manner of maintaining the tension; Fig. 4, a partial plan view of the machine, showing the relation of the undulations of the bolting-cloth; Fig. 5, a detail perspective view of one of the pivoted holding devices for attaching the bolting-cloth and its side strips to the elevating-fingers. Fig. 6 is an enlarged cross-section through the holding device and bolting-cloth, illustrating the details of construction.

Referring now to the drawings in aid of the following description, A designates the bolting-chamber, of which there may be any convenient number in the machine at large.

B designates a web of bolting-cloth of the usual width and of a length sufficient to traverse the machine from end to end in a corrugated or wave-like contour, as shown. The web B is secured at opposite sides, by means presently to be described, to a series of vertical standards or fingers *c*, pivotally carried at the ends, respectively, of a corresponding series of levers *d*, which are pivoted to fixed fulcrum-supports *d'* beneath the web B. The free ends of the levers *d* rest upon the surface of eccentric-cams *e*, one for each two correspondingly opposite levers, which meet end to end in a pivotal connection. A yoke-piece $d^2$ extends from one of the levers beneath the eccentric, which thereby causes the levers to oscillate in both directions. The construction is shown in Fig. 3, which shows the single eccentric arranged to operate two fingers at opposite sides of the web in unison. The fingers thus related in opposite pairs operated in unison are arranged in series, and the several eccentrics or cams *e* occupy successively and uniformly advanced radial positions upon a common central shaft located in the central longitudinal plane of the web beneath the same. In the apparatus shown

these positions of the eccentrics are advanced in each successive instance ninety degrees beyond the last. From the bottom of each finger *c* is an adjustable spring connection *f* to a fixed part *d'* of the frame, and the tension of this spring connection gives the finger *c* the function of a lever of the first-class fulcrumed upon the end of the lever *d* and holding the web B always in tension without detriment to the action of the finger in elevating and depressing the web.

It will now be understood by reference to Fig. 2 that the successive rise and fall of each pair of fingers acting in unison at opposite sides of the web, proceeding in successive and similar motions from left to right throughout the length of the web in regular successive intervals, each opposite pair maintaining a constant tension of the web crosswise, produces an undulatory motion of the web substantially similar to the wave motion of the surface of water.

To assist in preserving proper and uniform lines of curvature in the web at all times and preventing "buckling," I attach to the web at each side an edging-belt *g*, of leather or other suitable material. This I prefer to secure by means of a strip of cloth *g'*, folded completely around the belt and embracing the edge of the bolting-cloth between its opposite edges, to which it is securely stitched through and through, making a fastening such as illustrated in Fig. 6. The edging-belt *g* is fastened to the finger *c* by means of a peculiarly-formed yoke-piece *h*. (Illustrated in Figs. 5 and 6.) The jaws *h'* of the yoke are curved in opposite directions, as indicated in Fig. 5. The belt *g* rests between the jaws, held by a pin *p*, passed through both jaws, and the yoke-piece is held to the finger *c* by a pivotal stud $h^2$, extending centrally from the back of the yoke. The curvature of the sides or jaws *h'* of the joke is approximately that of the upper and lower curves of the undulations of the web B, and it will be readily seen from the illustration in Fig. 2 that the curved yoke-pieces *h*, coöperating with the edging-belt *g*, (whose slight stiffness is a factor in the operation,) preserve the proper lines of curvature in the web B at all times when in operation.

The operation is as follows: The crushed grain or "stock" from the reducing-rolls is fed to the web at the receiving end, and as the undulations are continually moving in a forward direction the stock is constantly carried forward upon the forward inclines of the undulations, producing a gentle sifting action, in which the finer particles fall to the web and pass through in a manner analogous in some degree to the action of starch and gluten on the "starch-plane." The stock tends to distribute itself in an even layer through gravity, and that which is carried to the end of the web is dropped into suitable chutes, while that which passes through the web is carried by a moving belt to its appropriate place. The stock is kept from overflow at the sides of the web B by side curtains *i*, stitched to the web and hung upon buttons *i'*, attached to the fingers *c*, thus forming side walls, preventing any loss of material.

I claim as my invention and desire to secure by Letters Patent of the United States—

1. In a bolting-machine, the combination with a bolting-cloth fixedly secured at each end, of a series of vertically-moving supports arranged in pairs at opposite sides of the bolting-cloth, and adapted by their rhythmical vertical reciprocation in fixed planes of movement to produce a consecutive series of undulations or "waves" traveling from end to end of the bolting-cloth, and means for operating said supports.

2. A bolting-machine embodying in combination a containing frame or chest, a bolting-cloth fixedly secured at its ends thereto, a series of vertically-reciprocated supports secured to the cloth at opposite sides, and means connected with the supports for holding the cloth with a yielding tension.

3. In a bolting-machine, the combination of a containing frame or chest, a bolting-cloth fixedly secured thereto at its ends, a series of standards or supporting-fingers secured to the cloth at opposite sides, and means substantially as described for reciprocating opposite supporting-fingers synchronously in vertical planes in rhythmically consecutive movements, substantially as and for the purpose set forth.

4. In a bolting-machine, the combination of a containing frame or chest, a bolting-cloth fixedly secured at its ends thereto, a series of vertically-moving standards or supporting-fingers securing the cloth at opposite sides, springs operating upon the fingers to produce a yielding outward tension upon the cloth at all points of movement, and means substantially as set forth for vertically and rhythmically reciprocating the supporting-fingers, substantially as and for the purpose set forth.

5. In a bolting-machine, the combination of a containing frame or chest, the bolting-cloth attached at its ends thereto, a plurality of vertical fingers arranged in corresponding series at opposite sides and holding the cloth between them, a corresponding series of oscillating levers carrying the vertical fingers pivoted at their outer ends, and a central shaft carrying a series of eccentrics connected in actuating relations with the inner ends of the oscillating levers, substantially as set forth.

6. In a bolting-machine, the combination of a containing frame or chest, the bolting-cloth attached at its ends to said frame or chest, the vertically-reciprocating fingers secured to the cloth at opposite sides, the oscillating supporting-levers fulcrumed between their ends, the central shaft, the eccentrics upon said shaft and acting upon the le-

vers to reciprocate the fingers, and springs connecting with the lower ends of the fingers whereby the cloth is held with a yielding tension.

7. The combination with the bolting-cloth and the frame or chest to which its ends are secured, the vertical flanges to which the sides of the cloth are secured, supporting means for the fingers and means for operating the fingers, of the yoke-pieces having curved sides, said yoke-pieces pivoted to the fingers and holding the bolting-cloth between their curved sides, substantially as set forth.

8. The combination with the frame or chest, the bolting-cloth secured at its ends thereto, the vertically-reciprocating devices at opposite sides thereof, and means for operating said devices, of belts of leather or other elastic material along the opposite edges of the cloth and a covering for the belts, and means connecting the belts with the reciprocating devices.

9. The combination of the frame or chest, the bolting-cloth secured at its ends thereto, vertically-reciprocating devices at opposite sides of the cloth, means for operating said devices, side strips of cloth or material having their lower edges secured to the bolting-cloth, and attaching devices whereby the upper edges of said strips are secured to the reciprocating devices, said strips serving as opposite side walls to prevent the escape of material under treatment.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

RILEY A. STUBBS.

Witnesses:
L. M. HOSEA,
WALTER A. KNIGHT.