

(No Model.)

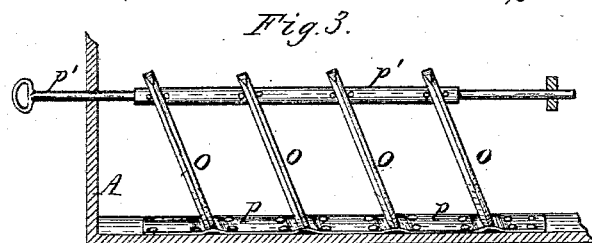
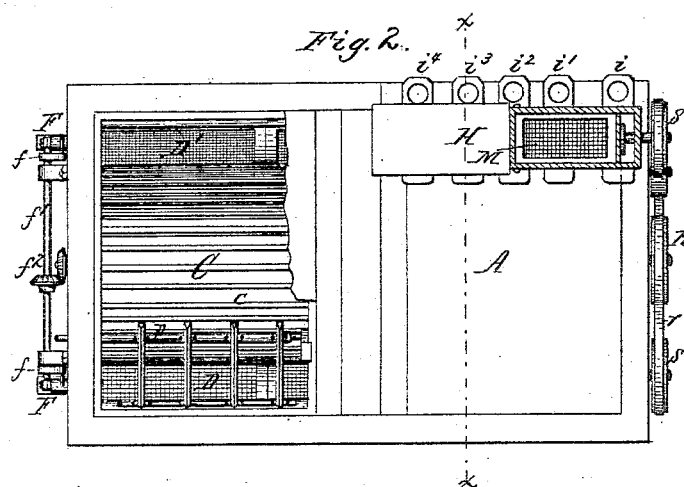
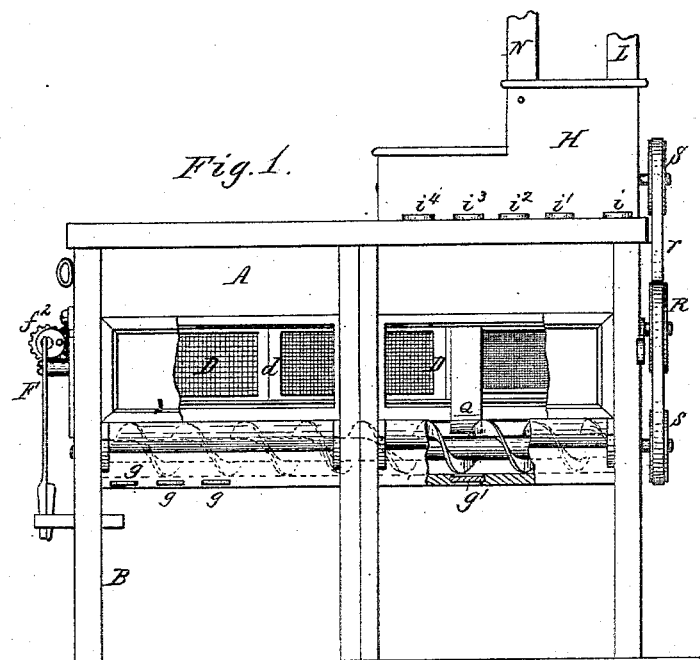
3 Sheets—Sheet 1.

C. J. SHUTTLEWORTH & O. M. MORSE.

BOLTING APPARATUS.

No. 304,139.

Patented Aug. 26, 1884.



*Chas. J. Buckheit*  
*Edw. J. Brady* } Witnesses.

*Inventors*  
*C. J. Shuttleworth*  
*O. M. Morse*  
*By* *Michael J. Bennett*  
*Attorneys*

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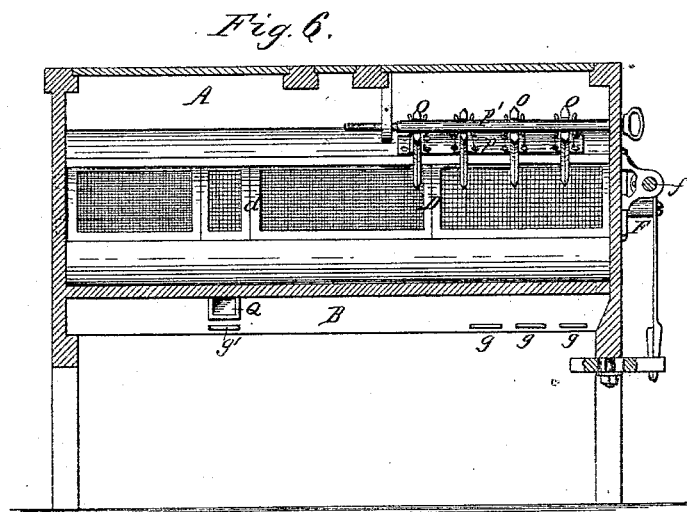
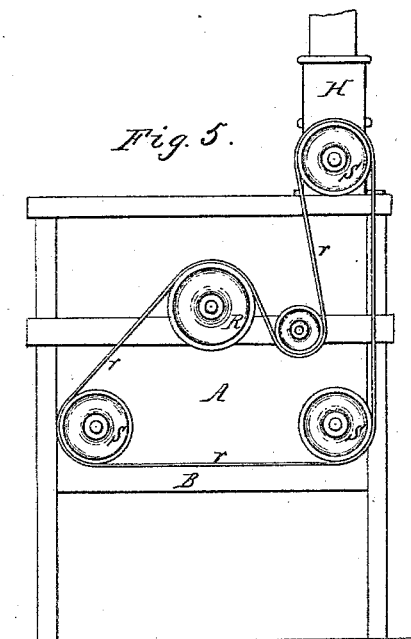
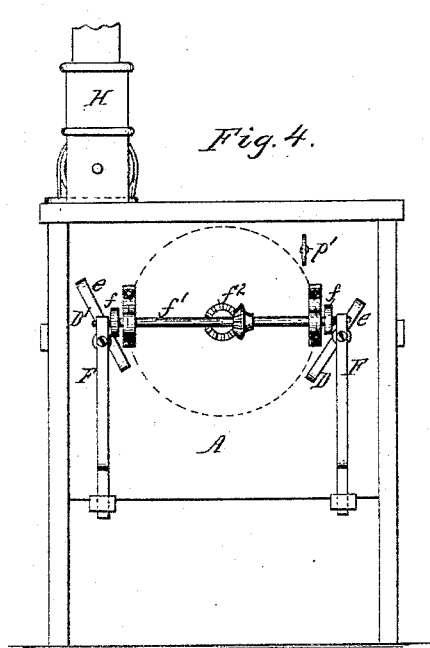
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C. J. Shuttleworth  
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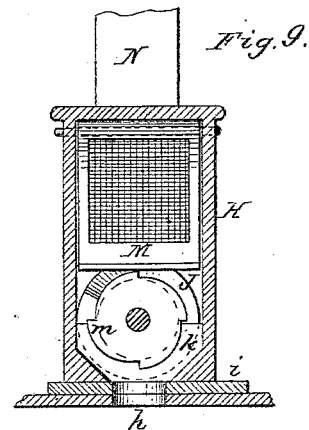
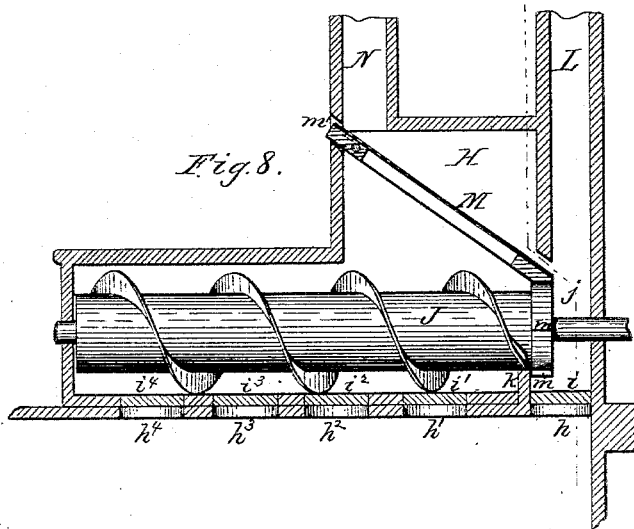
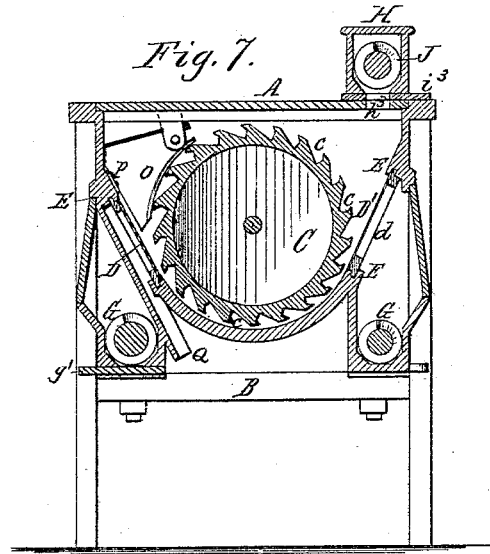
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C. J. Shuttleworth.....  
Orville M. Morse.....  
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*Attorneys*

# UNITED STATES PATENT OFFICE.

CHARLES J. SHUTTLEWORTH AND ORVILLE M. MORSE, OF SPRINGVILLE,  
NEW YORK, ASSIGNORS, BY MESNE ASSIGNMENTS, TO THE KNICKER-  
BOCKER COMPANY, OF JACKSON, MICHIGAN.

## BOLTING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 304,139, dated August 26, 1884.

Application filed May 26, 1880. (No model.) Patented in England March 2, 1880, No. 915; in France March 3, 1880, No. 133,362; in Belgium March 5, 1880, No. 50,750, and July 24, 1880, No. 52,105; in Canada August 23, 1880, No. 11,676; in Austria September 22, 1880, No. 24,850, and in Germany January 8, 1881, No. 12,252, and May 25, 1881, No. 13,736.

*To all whom it may concern:*

Be it known that we, CHARLES J. SHUTTLEWORTH and ORVILLE M. MORSE, both of Springville, in the county of Erie and State of New York, have invented new and useful Improvements in Bolting Apparatus, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to improvements in that class of bolting apparatus in which an inclined bolting-surface is employed in connection with an elevating mechanism, whereby the material to be bolted is elevated from the bottom of the case and delivered near the upper end of the inclined bolting-surface, over which the material is caused to pass a great many times during the operation of bolting. A bolting apparatus of this character is described and shown in Letters Patent of the United States No. 225,536, granted to us March 16, 1880, to which reference is here made for a full description thereof.

In the accompanying drawings, consisting of three sheets, Figure 1 is a side elevation of our improved machine. Fig. 2 is a top plan view thereof with a portion of the cover removed. Fig. 3 is a detached view showing the deflecting-boards in an oblique position. Fig. 4 is an elevation of the tail end of the machine. Fig. 5 is an elevation of the head end of the machine. Fig. 6 is a longitudinal section of the machine. Fig. 7 is a cross-section in line *x x*, Fig. 2. Fig. 8 is a longitudinal section of the feed mechanism on an enlarged scale. Fig. 9 is an end view of the device whereby the screen of the feed mechanism is agitated.

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

A represents the case of the machine, supported by a suitable frame-work, P.

C is the elevating mechanism, of any suitable construction, that shown in the drawings consisting of a wheel or drum provided with longitudinal buckets *c*, applied to the periphery of the wheel.

D represents the inclined bolting-surface arranged on the descending side of the elevating mechanism, and consisting of a suitable number of frames, *d*, covered with bolting-cloth of various degrees of fineness. The frames *d* are held between parallel guides or ways E, running lengthwise of the machine, and having an opening, *e*, through the tail-board of the machine for the introduction and removal of the frames *d*.

D' represents the inclined bolting-surface arranged on the ascending side of the elevating mechanism, and composed of frames *d*, covered with bolting-cloth, and secured removably between parallel ways E, like the frames of the bolting-surface D. The bolting-surface which faces the ascending side of the elevating mechanism operates upon all the material which is spilled or dropped from the elevating mechanism, thereby increasing the bolting capacity of the machine and shortening the length thereof.

F represents a knocker applied to the tail end of each series of frames *d*, actuated by a cam or crank, *f*, mounted on a horizontal shaft, *f'*, which is driven by bevel-gears *f''* from the rear end of the shaft of the elevating mechanism.

G is a screw-conveyer arranged underneath each bolting-surface, and provided with suitable slides, *g g'*, which permit different parts of the bolted material to be drawn off separately, or to be remingled, as may be desired.

H represents the feed-chamber, arranged upon the cover of the casing A of the machine, preferably over the ascending side of the elevating mechanism. It is provided in its bottom with a number of openings, *h h' h'' h''' h''''*, through either of which the material to be bolted may be introduced into the machine, and which are provided with slides *i i' i'' i''' i''''*, for opening and closing them.

J represents a screw-conveyer arranged on the bottom of the feed-chamber H, so as to convey the material from the head toward the tail end thereof. The conveyer-flights do not ex-

tend quite to the head of the feed-chamber, so as to leave above the first feed-opening, *h*, a space, *j*, in which the material is not moved horizontally by the conveyer. This space is preferably separated from the rest of the feed-chamber by a concave partition, *k*, placed transversely upon the bottom of the feed-chamber, between the first and second openings, *h* and *h'*.

*L* represents a spout which conducts the material to be bolted to the space *j* at the head of the feed-chamber.

*M* is an inclined screen arranged in the feed-chamber above the head portion of the conveyer *J*, so as to discharge the material which passes through the meshes of the screen into the conveyer-trough in rear of the partition *k*, while the tailings pass over the screen into the space *j* in front of the partition *k*. The screen *M* is pivoted or otherwise held at its upper end, and rests with its lower end upon the conveyer-shaft, which is provided at that point with cams or projections *m*, whereby the screen is jarred or agitated. The screen *M* is made readily removable from the feed-chamber through a slot, *m'*, formed opposite the upper end of the screen, or in any other suitable manner.

*N* represents the spout which delivers the material to be bolted to the head of the screen *M*. The latter is so clothed that it effects a separation of the coarser particles of bran from the rest of the ground meal, the coarser particles passing over the tail of the screen into the chamber *j*, and the rest of the ground meal passing through the meshes of the screen into the trough of the conveyer *J*.

*O* represents deflecting-boards arranged in the rear portion of the case *A*, opposite the upper descending side of the elevating mechanism. The boards *O* are arranged at suitable distances apart, and secured with their outer sides to a strip of canvas, *p*, which is tacked to the inner side of the case *A*; or they may be pivoted or hinged at their outer sides to the case of the machine in any other suitable manner. The boards *O* are connected at their inner ends, and simultaneously operated by a rod or bar, *p'*, which projects through the tail-board of the case *A*, and is provided with a suitable handle at its outer end. When the boards *O* are placed at right angles to the axis of the elevating-wheel *C*, they do not affect the movement of the material through the apparatus; but when they are inclined toward the head of the machine, as shown in Fig. 3, the material discharged from the buckets of the reel is deflected toward the head of the machine, and its discharge from the machine is accordingly retarded. The elevating mechanism is inclined toward the tail of the machine, like an ordinary bolting-reel, to give the material a tendency to work from the head toward the tail of the bolting-surface. Sometimes it becomes desirable to retain the material longer in the rear portion of the machine than it would stay therein by reason of the

inclination of the apparatus. This is readily accomplished by properly adjusting the deflecting-boards *O*.

*Q* represents a spout, chute, or inclined conduit arranged against the under side of that portion of the bolting-surface through which pass the middlings of the first separation. In small mills it is sometimes not possible to provide a separate bolting apparatus for the treatment of the reground middlings. When this is the case, we clothe the head of the bolting-surface with cloths, through which the fine flour and then the middlings of the reground middlings are bolted, and arrange the spout *Q* under that portion of the cloth through which the middlings of the reground middlings are bolted. The spout *Q* collects these middlings and delivers the same into a separate receptacle, and the flour from the reground middlings is collected by the head portion of the conveyer *G*, and discharged through the first slide, *g*. In this manner the products derived from the bolting of the reground middlings at the head of the bolting-surface and the bolting of the ground wheat through the remainder of the bolting-surface are kept separate. The spout *Q* is so arranged in the machine that it can be readily applied or removed, as circumstances may require. The conveyers *G* and *J* are driven from a pulley, *R*, mounted on the shaft of the elevating-wheel *C*, by an endless belt, *r*, running over pulleys *S* on the conveyer-shafts, or in any other suitable manner.

When the machine is intended to be used for the bolting of ground wheat or other material in a single operation, the spout *Q* is removed, and the ways *E* are provided with frames *d*, having cloths of the requisite degrees of fineness in the proper order, as may be necessary or suitable for the particular kind of work which the bolt is intended to perform. The material to be bolted is introduced into the feed-chamber *H* through the spout *L*, and passes thence into the case of the machine through the first opening, *h*.

When the material to be bolted is less in quantity than the capacity of the machine, it becomes desirable to shorten the passage of the material through the machine in order to prevent the layer of the material which passes over the bolting-surface from becoming so thin that specks will pass through with the flour. This is accomplished by removing the bran-sieve *M* and introducing the material through the spout *N*, when the material is delivered into the trough of the conveyer *J*, and may be admitted into the case *A* through either of the openings *h'*, *h''*, *h'''*, *h''''* at a greater or less distance from the head of the machine.

When it is desired to bolt both reground middlings and ground wheat on the same machine simultaneously, the bran-sieve *M* and the spout *Q* are replaced, and the bolting-surface is arranged for bolting reground middlings from the head to and including the sur-

face covered by the spout Q, and ground wheat from the spout Q to the tail of the machine. The ground wheat is introduced into the feed-chamber H through the spout N and the reground middlings through the spout L. The coarse bran is separated from the ground wheat by the sieve M, and passes over the tail thereof into the space *j*, and thence, together with the reground middlings, through the first opening, *h*, into the machine. All the finer portions of the ground wheat pass through the sieve M into the trough of the conveyer J, which conducts this material to the last opening, *h*<sup>4</sup>. The latter is located farther from the head of the machine than the spout Q, and admits the ground wheat into the machine at a point where the bolting of the reground middlings is completed, the intermediate slides being closed. By this means the coarse bran is made to traverse the entire bolting-surface, and is utilized first during the bolting of the reground middlings, which operation is greatly facilitated by the presence of the bran, and then commingled with the ground wheat from which it was separated by the sieve M, and which it accompanies in its passage through the rest of the machine. When the machine is so used, the bolted middlings-flour is drawn off through the slide *g*<sup>1</sup>, and the bolted wheat-flour, middlings, &c., through the slides *g*.

We claim as our invention—

1. In a bolting apparatus, the combination, with an elevating mechanism, of an inclined bolting-surface facing the elevating mechanism, and composed of two or more sections of different degrees of fineness arranged side by side, a feed mechanism whereby the material to be bolted can be introduced into the machine at a greater or less distance from the head thereof, and mechanism whereby different grades of material which are sifted through the inclined bolting-surface can be removed separately, substantially as set forth.

2. In a bolting apparatus, the combination, with an elevating mechanism and an inclined bolting-surface composed of two independent

sections arranged side by side, of a feed mechanism and a separating-screen whereby the coarse bran is separated and conducted to the head of the first section of the bolting-surface, together with the reground middlings, and the material passing through the screen is admitted to the machine at the head of the second section of the bolting-surface, substantially as set forth.

3. In a bolting apparatus, the combination, with an elevating mechanism, of an inclined bolting-surface facing the elevating mechanism, and deflecting-boards whereby the motion of the material through the machine is regulated, substantially as set forth.

4. The combination, with the elevating mechanism C, of the inclined bolting-surface D, composed of two sections arranged side by side, and the spout Q, receiving the material bolted through the tail portion of the head-section, substantially as set forth.

5. The combination, with the elevating mechanism C, of the inclined bolting-surface D, the feed-chamber H, provided with a series of discharge-openings in its bottom, and the conveyer J, arranged on the bottom of the feed-chamber H, substantially as set forth.

6. The combination, with the elevating mechanism C and inclined bolting-surface D, of the feed-chamber H, screen M, arranged in said chamber, the opening *h*, which admits the tailings of the screen to the head of the machine, the conveyer J, receiving the material which passes through the screen, and one or more discharge-openings, *h*<sup>4</sup>, substantially as set forth.

C. J. SHUTTLEWORTH.

ORVILLE M. MORSE.

Witnesses to the signature of C. J. Shuttleworth:

JNO. J. BONNER,

EDW. J. BRADY.

Witnesses to the signature of Orville M. Morse:

A. H. MUNSON,

THEO. F. MORSE.