(No Model.)

C. S. FULLER.

FLOUR BOLT.

No. 479,589. Patented July 26, 1892.

Fig. 1.

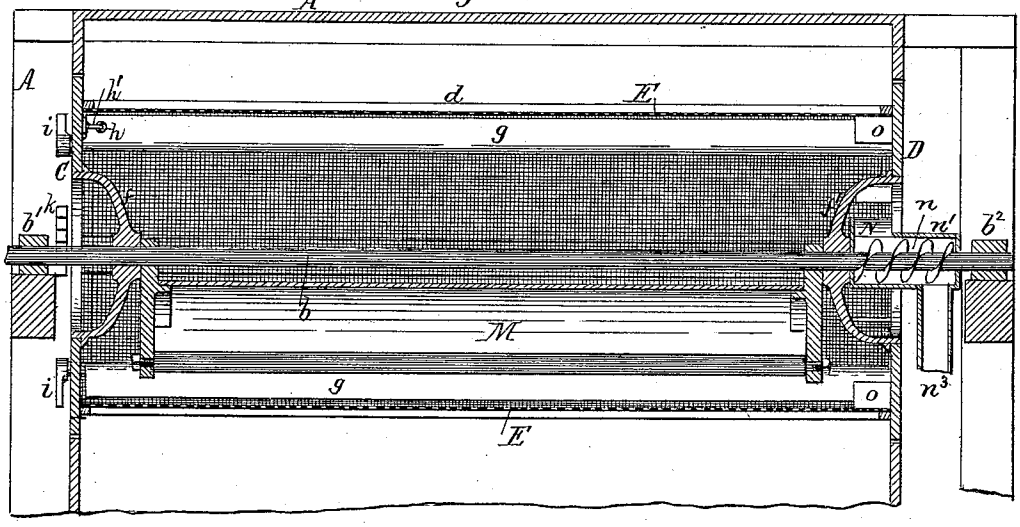


Fig. 3.

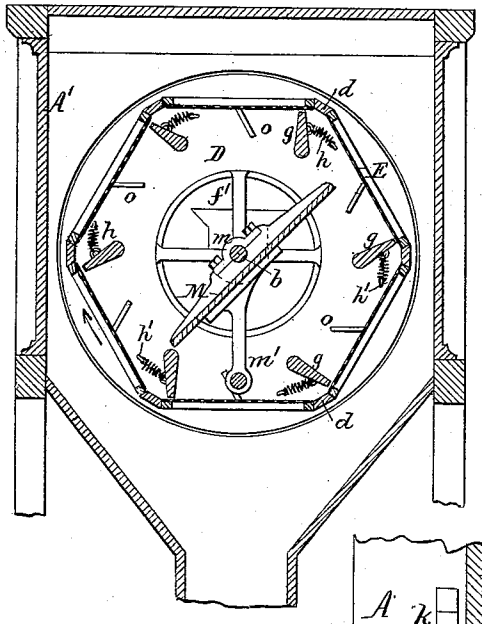


Fig. 2.

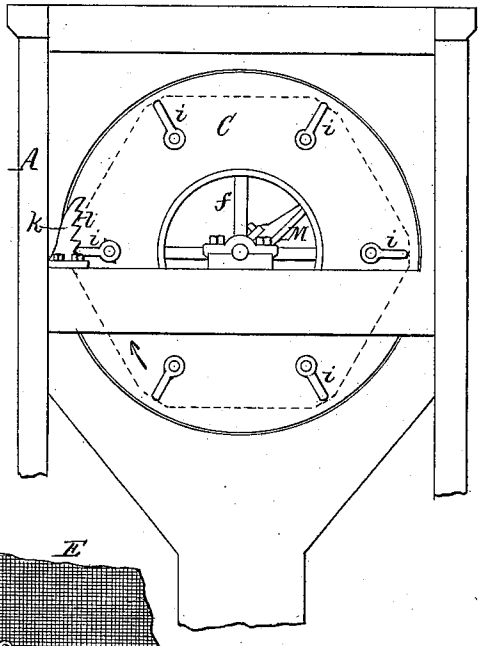
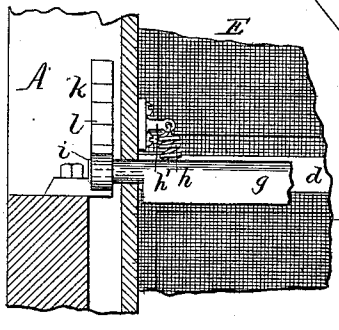


Fig. 4



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

UNITED STATES PATENT OFFICE.

CLARK S. FULLER, OF LAFAYETTE, INDIANA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE GEO. T. SMITH MIDDLINGS PURIFIER COMPANY, OF JACKSON, MICHIGAN.

FLOUR-BOLT.

SPECIFICATION forming part of Letters Patent No. 479,589, dated July 26, 1892.

Application filed July 27, 1883. Serial No. 102,042. (No model.)

To all whom it may concern:

Be it known that I, CLARK S. FULLER, of Lafayette, in the county of Tippecanoe and State of Indiana, have invented new and useful Improvements in Flour-Bolts, of which the following is a specification.

This invention relates more specifically to that class of rotating flour-bolts in which the bolting-cloth is so supported that its inner surface is comparatively unobstructed, so that material being sifted may slide downward over such inner surface more freely than is possible in reels which have ribs projecting inward from the cloth.

In my reel I employ, in combination with a practically unobstructed bolting-surface, a series of elevators or lifting blades or buckets having their outer edges slightly separated from the adjacent cloth, together with a deflector which, as the reel rotates, receives material that has been carried up by the elevators and poured over their inner edges, falling thence upon the deflector, from which it is discharged upon the bolting-cloth. When the reel rotates, the elevators carry upward with them material which has accumulated in the lower part of the reel, the heavier portions lying upon or immediately adjacent to the cloth, while the lighter specks and other impurities are upon the inner surface of the layer or adjacent thereto. As such material is being carried up by the elevators some of the purer portions of it will sift through the cloth below each of the elevators, while other portions will be poured over their inner edges upon the deflector. While thus falling from the elevators to the deflector and passing thence to the cloth the heavier particles travel the fastest, and, leaving the lighter impurities behind, will reach the cloth and be sifted through it, whereby the capacity of the bolt is largely increased and a better separation effected than is possible with prior constructions.

In carrying out my invention I prefer to use a series of bars or ribs connecting the reel-heads and support the cloth therefrom intermediate of the reel-heads with elevators which are separate and apart from the ribs or bars.

One part of the invention for which protection is sought herein relates to mechanism wherein there is combined an uninterrupted bolting-surface and a series of elevators having their outer edges at some distance from the bolting-cloth, leaving spaces or throats through which material can pass between the outer edges of the elevators and the cloth. As illustrated, the elevating blades or buckets have combined with them pivotal connections, crank-arms, and a stop or cam attached to the frame of the bolt, whereby as the reel rotates the elevators are automatically oscillated or tilted about their pivots; but this part of the invention relating to such oscillating or tilting mechanism is not claimed herein, it constituting the subject-matter of some of the claims of my concurrently-pending application, Serial No. 396,421, filed June 16, 1891. Hence I do not claim herein any of the inventions which are referred to in the claims of such last above-mentioned case.

I do not claim herein any of the inventions which are claimed in my concurrent application, Serial No. 224,932, which shows a modification of my invention.

In the accompanying drawings, Figure 1 is a longitudinal section of a bolting-reel provided with my improvements. Fig. 2 is an end elevation thereof. Fig. 3 is a cross-section thereof. Fig. 4 is an enlarged sectional view of the mechanism whereby the buckets are turned.

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

A represents the stationary frame, and A′ the stationary casing, which may be of any well-known and ordinary construction.

B represents the reel-shaft, which is supported in bearings b' b^2, secured to the frame A.

C represents the circular head of the reel arranged at its feed end, and D the circular-head arranged at its discharge end.

d are the longitudinal ribs whereby the heads C and D are connected. Six such ribs are shown in the drawings; but a greater or less number may be employed, as may be preferred.

E represents the bolting-cloth, which is secured to the inner sides of the ribs *d*, whereby there is formed a bolting-surface having a comparatively continuous surface unbroken upon the inner sides of the bolt by any projections whatever, so that material can slide freely over its surface, except as hereinafter noted.

f is a spider whereby the head C is secured to the shaft *b*, and *f'* is a similar spider whereby the head D is secured to the shaft *b*.

g represents longitudinal oscillating elevator plates or buckets, which are arranged in the reel near the ribs *d* and pivoted to the heads C and D. The buckets are journaled or pivoted at or near the inner edges, so that by turning the buckets on their pivots their outer edges can be swung away from the bolting-cloth or be made to approach the bolting-cloth. The buckets or plates *g* are held in their elevated positions with their outer edges in close proximity to the bolting-cloth by springs *h*, which are attached at their inner ends to the buckets and at their opposite ends to supports *h'*, attached to the adjacent heads of the reel, the outer edges of the elevators being arranged at short distances from the inner surface of the bolting-cloth. With these buckets or plates I combine tilting devices, of which parts are stationarily mounted on the reel-support, other members or parts being mounted upon and carried by the rotating reel, so that by the revolution of the reel these tilting devices cause the oscillations of the elevators to discharge the material resting upon them. The pivot at the end of each bucket extends through one of heads of the reel, as shown in the drawings, through the head C, and is provided at the outer side of the head with an arm *i*.

k represents a cam or stop which is secured to the frame near the head C, so as to come in contact with the arms *i* of the buckets as the reel revolves, the stop being so arranged on the frame that the arm of each bucket strikes the stop when the section of the reel below the bucket is in the proper position for bolting. The stop *k* arrests the movement of the arm *i* and of the bucket to which it is attached, so that by the conjoint operation of the cam or stop *k* and the rotating reel as the reel continues its movement in the direction of the arrows in Figs. 2 and 3 the bucket is turned on its pivot to swing its outer edge away from the bolting-cloth and discharge the material which rests upon the bucket upon the section of bolting-cloth next below the bucket. The stop *k* is preferably constructed on its face with a number of shoulders or ratchets *l*, over which the arm *i* slides as the reel rotates, and whereby the bucket is jarred and depressed or turned a little at a time, thereby causing the material to be discharged from the bucket in small quantities successively. When the arm *i* has passed the stop *k*, the springs return the bucket to its former position, which is that indicated in Fig. 3—to wit, with its outer edge at a short distance from the inner surface of the bolting-cloth.

M represents an inclined board, which is hung upon the shaft *b* and arranged so as to collect the material which may have been accidentally elevated by the buckets and which returns such material to the working section of the reel near the lower portion of the ascending side of the reel, and, as will be seen by an examination of Fig. 3, part of the material thus discharged upon the board M and by it deflected from its downward course is discharged upon an inclined surface of the reel over which it slides, and is thereby adapted for bolting, whereas were it not for the presence in the bolt of this deflector more or less of the material which is carried up by the elevators would fall from them to and upon the layer of material in the bottom of the bolt and interfere seriously with its proper operation. The plate M prevents this elevated material from falling directly upon the lower portion of the reel, which would cause specks and other impurities to be driven through the meshes of the bolting-cloth. The plate M is loosely hung upon the shaft *b* by bearings *m*, and is retained in its proper inclined position by the depending weight *m'*.

As the elevators are specially adapted for use with an inclined board or other deflector which returns material to the bolting-cloth, it will be readily seen that it is desirable to use them in combination with a reel having its heads connected with each other by longitudinal ribs instead of a series of spokes between its heads, because the absence of intermediate spokes facilitates the use of a deflector. Again, as it is desirable to support the cloth at various points between the reel-heads without obstructing the flow of material over the cloth, it is desirable to support the elevators from the reel-heads at points between the cloth and the axis of the reel and without any contact between the elevators and the cloth-supports at the points where the cloth engages with its intermediate supports.

n represents a screw conveyer, which is secured to the shaft *b* at the tail end of the reel, and *n'* is the trough of the conveyer, provided on the inner side of the head D with a receiving-hopper N and at the outer end of said head with a discharge-spout n^3.

o represents short buckets or flights, which are secured to the inner side of the head D near the bolting-cloth and which elevate the material that has not passed through the meshes of the bolting-cloth and deliver the same into the receiving-hopper N of the discharge-conveyer.

The material to be bolted is introduced into the reel through the central opening of the head C by a spout or other suitable feed device. More or less of the material which is fed upon the lower portion of the reel is successively elevated by the buckets or plates *g*

and retained by the bucket until the section of the reel next below the bucket is in the proper position for bolting, when the arm *i* of the bucket comes in contact with the stop *k*, whereby the bucket depressed and the material resting on the bucket is discharged upon the inclined bolting-surface below the bucket over which it descends, and whereby the fine material is separated from the coarse parts, the bolting operation being effected slowly by the descending movement of the material over the inclined bolting-surface. The impact of the descending material is received by the bucket at the lower end of the inclined bolting-surface, whereby specks are prevented from being driven through the meshes of the bolting-cloth, and the turning of the bucket causes the lower layers of the material resting on the bucket to be discharged first, whereby the lighter and impure layers are retained in their proper position on top of the material to be bolted, which also prevents the specks from being driven through the meshes of the bolting-surface. The bucket which receives the material at the lower end of the inclined bolting-surface elevates the material until this bucket is turned, when the operation of bolting is repeated. In this manner the operation of bolting is rendered more continuous and the quality of the bolted material is greatly improved by excluding specks and other impurities therefrom, whereby my improved machine is especially adapted for bolting returns and other similar products which contain a large percentage of impurities, it being of course understood that in all this class of bolts in which the outer edges of the elevators are supported in close proximity to the bolting-cloth more or less of the material (dependent upon its character as regards size of granules) will be intercepted and caught by the bucket below the one which is being tilted, instead of sliding between the outer edge of that lower bucket and the bolt-cloth.

It will be understood that by reason of the combination of the reel having an unobstructed bolting-surface elevators having their outer edges slightly separating from the bolting-cloth and a deflector which receives material poured over the inner edges of the elevators and discharges or delivers material to the working or sifting portions of the bolt-cloth operates more effectively as regards the capacity of the bolt and a desirable separation of impurities from the sifted material than will a bolt from which some one of the above-enumerated features of construction is absent.

What I claim is—

1. In a flour-bolt, the combination of reel-heads, longitudinal ribs connecting the reel-heads, a bolting-cloth supported upon the reel-heads and by the longitudinal ribs intermediate of the reel-heads and having an uninterrupted inner surface, and lifting plates or buckets mounted within the reel and having their outer edges out of contact with the bolting-surface, substantially as set forth.

2. In a flour-bolt, the combination of a rotary reel having an uninterrupted inner surface, a deflector within the reel adapted to direct material to the bolting-cloth, and a series of intermediate longitudinal lifting plates or buckets secured to and revolving with the reel, their outer edges slightly separated from the bolting-surface, substantially as set forth.

3. A flour-bolt provided with a series of elevators arranged inside of the cloth with their outer edges at short distances from the cloth, in combination with a deflector which projects above the axis of the bolt and extends downward into close proximity to the bolting-cloth, whereby it is adapted to receive material taken up by the elevators and discharge the same upon the bolting-cloth, substantially as set forth.

4. In a flour-bolt, the combination of a rotating reel having an uninterrupted inner surface and a series of elevators arranged inside of the cloth and supported from the reel-heads, their outer edges at short distances from the adjacent bolting-cloth, substantially as set forth.

5. In a flour-bolt, the combination, with a bolting-reel provided upon its inner surface with a series of elevators, of a single deflector suspended from the reel-shaft with its lower edge below the axis of the reel and in close proximity to the elevators on the upward moving side of the reel and having its opposite edge above the axis of the reel and in close proximity to the elevators on the downward moving side of the reel, substantially as set forth.

CLARK S. FULLER.

Witnesses:
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JAMES COMBS.