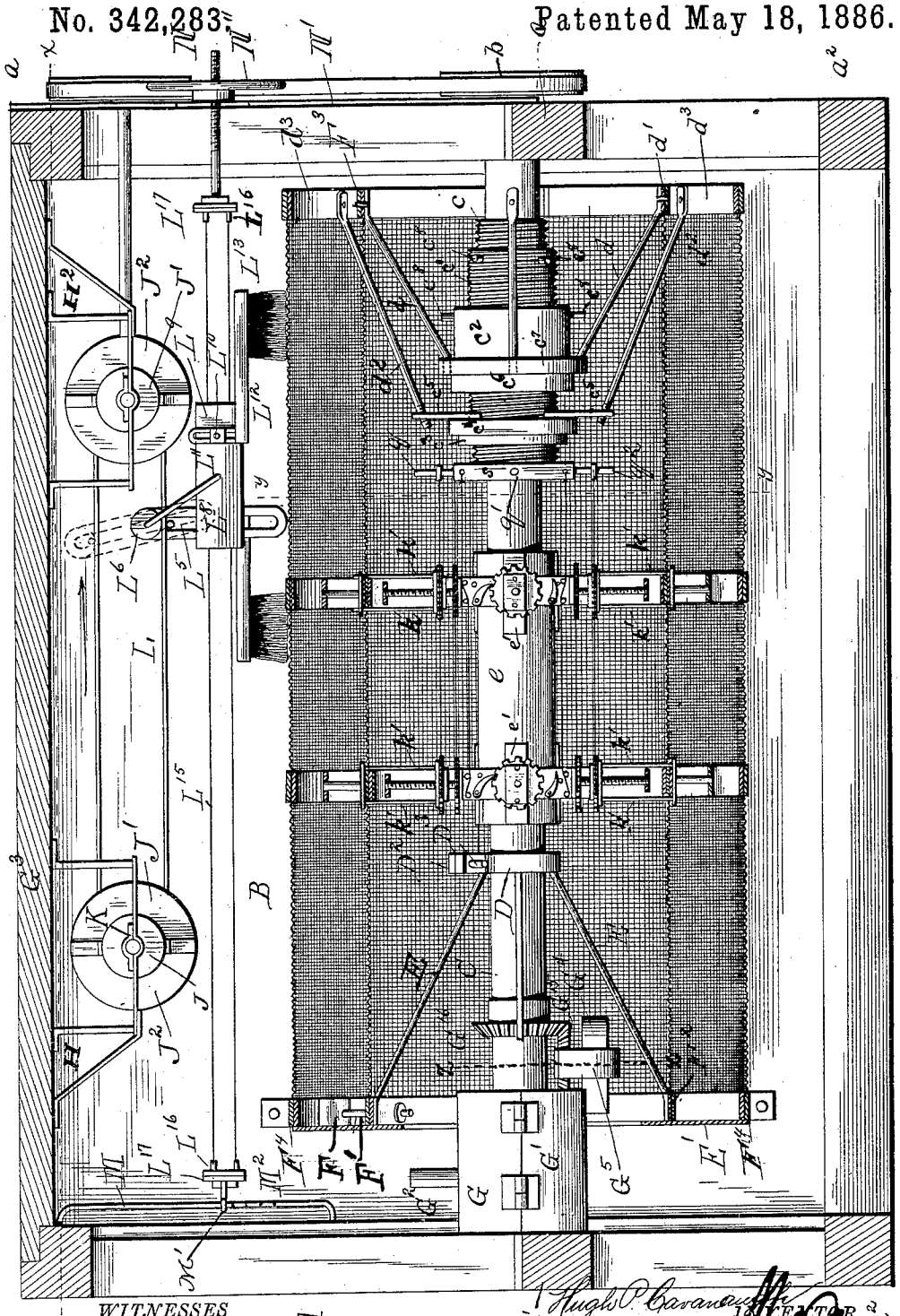
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H. P. CAVANAUGH.

BOLTING REEL.

No. 342,283. Patented May 18, 1886.



WITNESSES

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Hugh P. Cavanaugh

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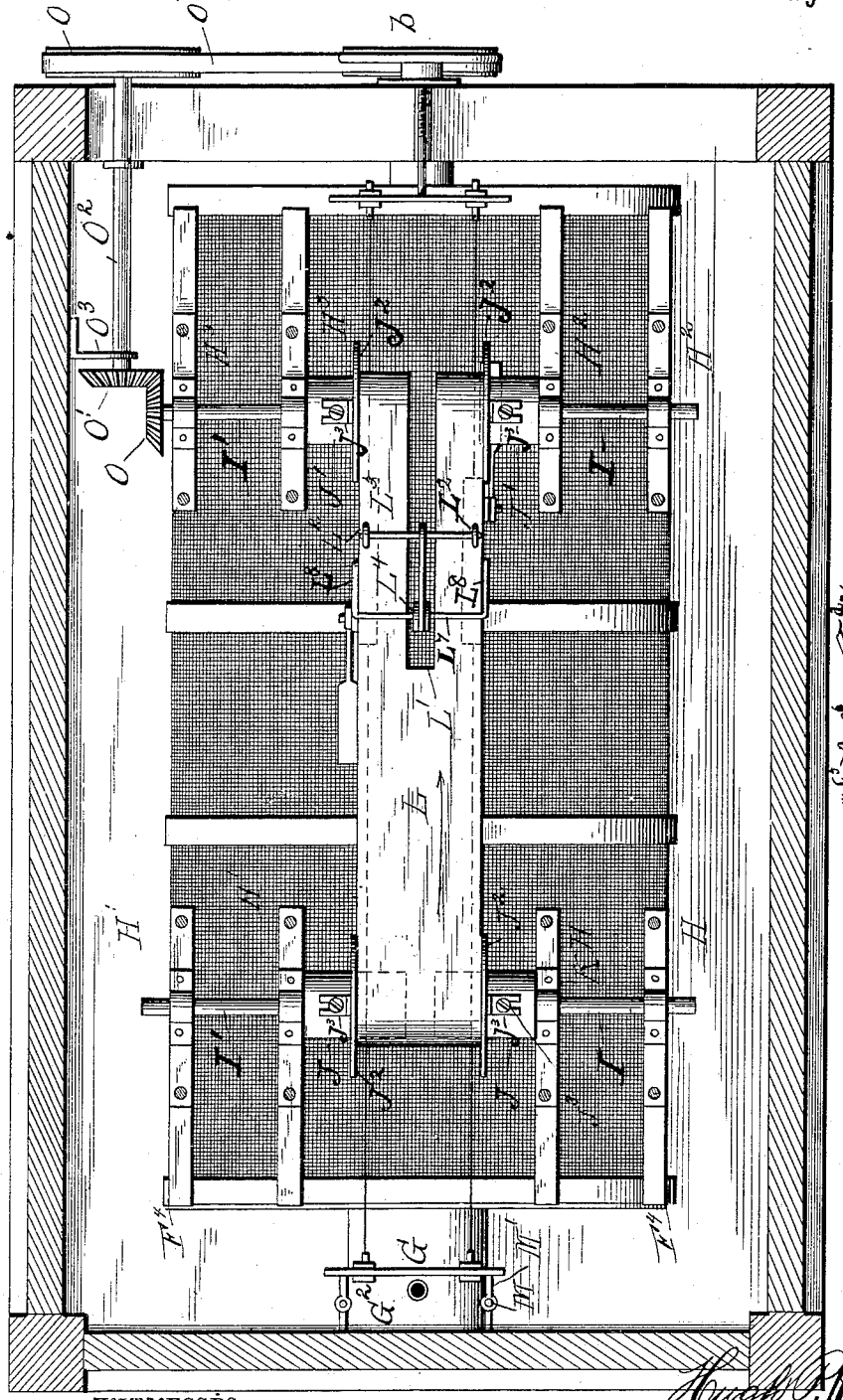
N. PETERS. Photo-Lithographer, Washington, D. C.

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BOLTING REEL.

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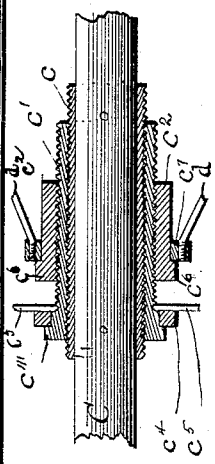


Fig. 3.

Fig. 2.

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(No Model.) 4 Sheets—Sheet 3.

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Fig. 4.

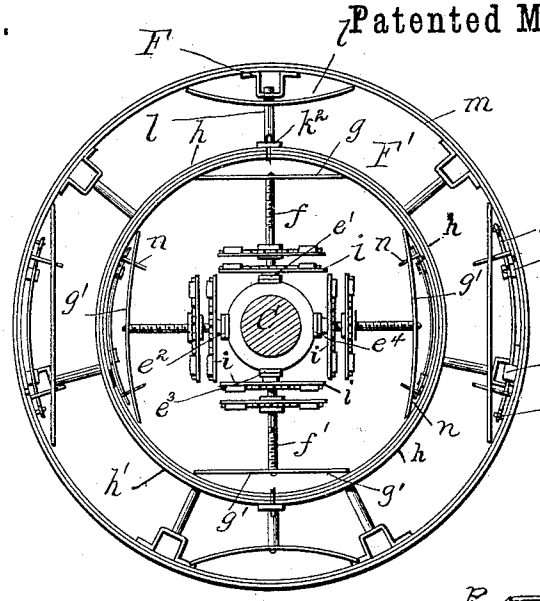


Fig. 7.

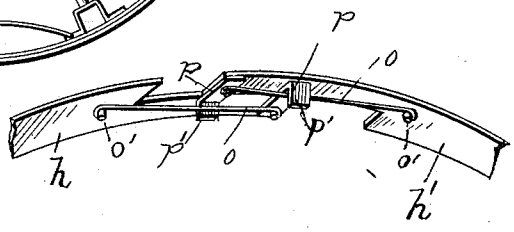


Fig. 5.

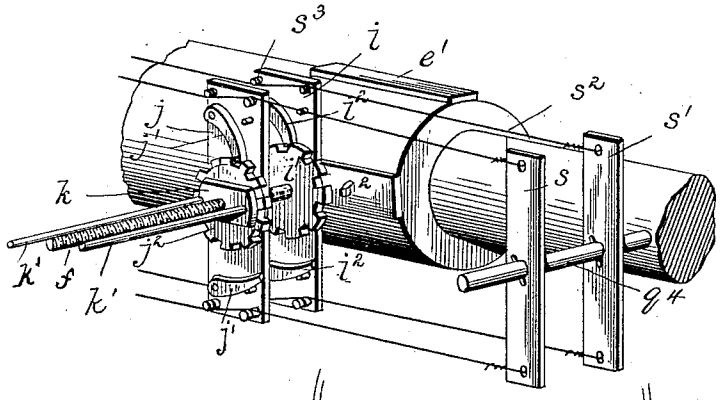
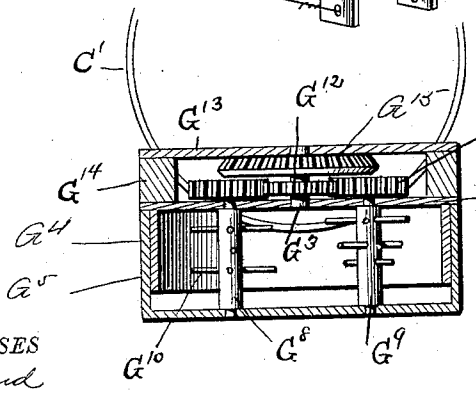


Fig. 6.



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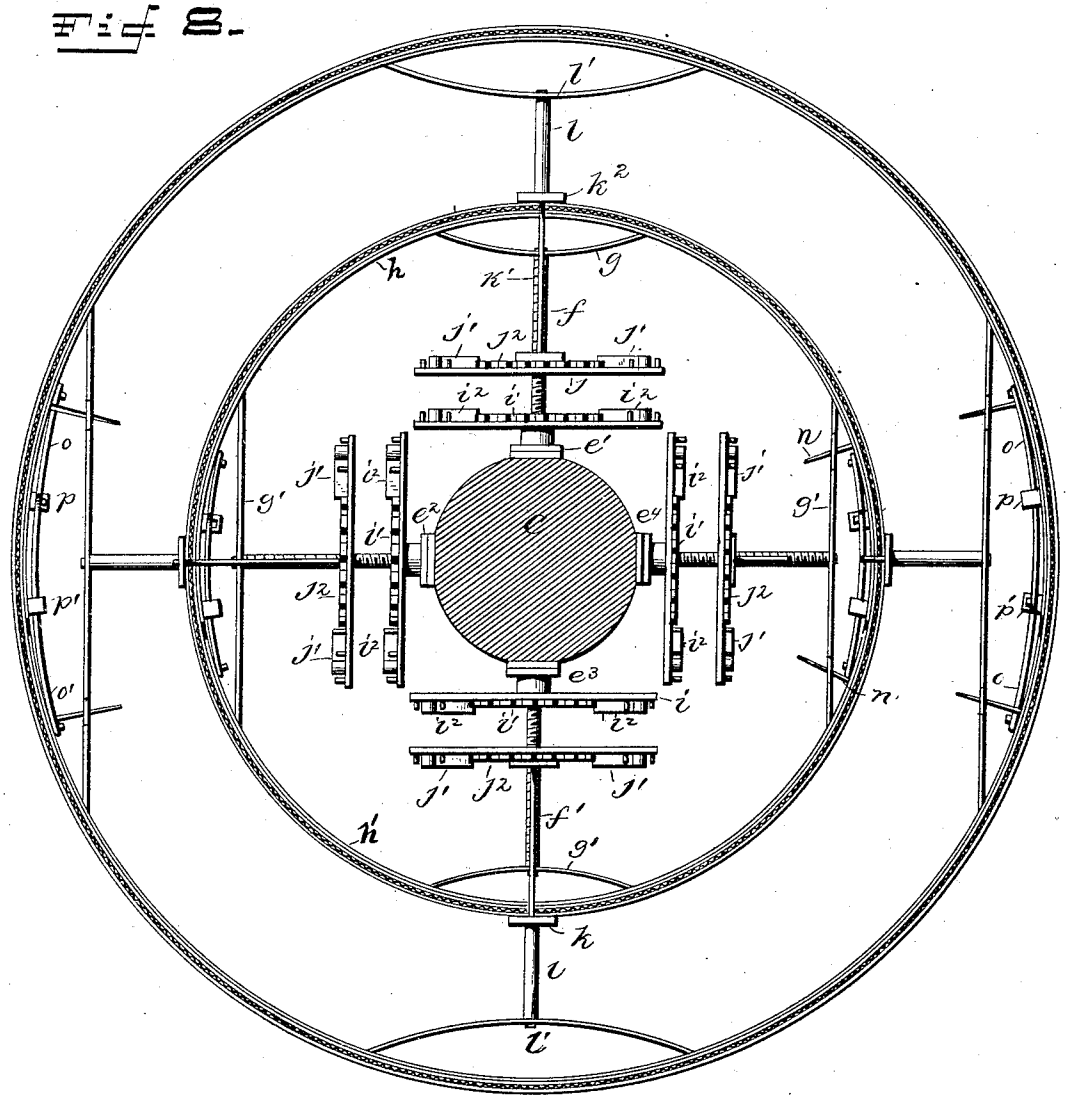
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Fig 8.



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UNITED STATES PATENT OFFICE.

HUGH P. CAVANAUGH, OF ADRIAN, MISSOURI, ASSIGNOR OF ONE-THIRD TO REUBEN BRYANT, OF SAME PLACE.

BOLTING-REEL.

SPECIFICATION forming part of Letters Patent No. 342,283, dated May 18, 1886.

Application filed September 4, 1885. Serial No. 176,201. (No model.)

To all whom it may concern:

Be it known that I, HUGH P. CAVANAUGH, a citizen of the United States of America, residing at Adrian, in the county of Bates and State of Missouri, have invented certain new and useful Improvements in Bolting-Reels; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

My invention has reference to certain new improvements upon the form of bolting-reels for which United States Letters Patent No. 301,803 were issued to me July 8, 1884; and the said invention consists in the improvements hereinafter set forth and claimed.

In the accompanying drawings, forming part of this specification, Figure 1 is a longitudinal vertical section of a bolting-chest having my improved reel cleaning and delivery devices arranged therein. Fig. 2 is a sectional plan view of the bolting-chest, taken on the dotted line *x x*, Fig. 1. Fig. 3 is a detail sectional view of part of the reel-shaft, illustrating the construction for adjusting the tail portion of the reel. Fig. 4 is a transverse section of the reel, taken on the dotted line *y y*, Fig. 1. Fig. 5 is a perspective view of another portion of the reel-shaft, illustrating the manner in which the inner and outer reels are adjusted. Fig. 6 is a detail sectional view on the line *z z*, Fig. 1. Fig. 7 is a detail perspective view illustrating the adjacent portions of two of the ring-sections, and Fig. 8 is an enlarged transverse section through the reel.

C refers to the shaft of the reel proper, which shaft has its ends bearing in the ends of the chest, and one of said ends projects beyond the chest, and has keyed thereon a pulley, *b*. The said reel-shaft has rigidly secured on its portion nearest the pulley *b* a metallic threaded sleeve, *c*. Screwed thereon is a second sleeve, *c'*, which is interiorly threaded to engage the threads of the sleeve *c*, and also exteriorly threaded for the reception and retention of a collar, c^2. The said sleeve *c'* terminates at its inner end in an annular shoulder, c^3, which presents an annular bearing seat for a ring, c^4, the latter being provided with a series of radial arms, c^5, which have an inclined threaded perforation near the outer end. The collar c^2 is likewise provided at its inner end with an annular shoulder, c^6, which also presents a bearing and seat for a ring, c^7, which is provided with a series of horizontal threaded perforations, for a purpose hereinafter explained. Both the sleeve *c'* and the collar c^2 are provided with a radial series of projecting pins, c^8, Fig. 1, by which said sleeve and collar can be adjusted by hand. A series of rods, *d*, form braces for connecting the ring c^7 and the tail-ring *d'* of the inner reel, and the said connections are effected by having the inner end of each rod bent horizontally, as illustrated most clearly in Fig. 3, in which the said inner end is threaded to engage one of the threaded openings in said ring. The outer end of each of said rods is bent horizontally and slightly flattened to form a bearing for the said bands *d'*, and each outer horizontal portion of the said rods is perforated to adapt it to be secured to the said bands by means of a threaded pin which passes through the same and engages with a threaded opening in the said bands. A series of brace-rods, d^2, likewise connects the rings c^5 and the tail rings or bands d^3 of the outer reel, the inner end of each of the rods d^2 being simply threaded, but not bent, to engage the inclined threaded opening in each of the arms c^5. The outer end of each rod d^2 is flattened and bent horizontally and perforated for attachment to the ring d^3 by means of a threaded pin, in a manner similar to that described with relation to the brace-rods and rings of the inner reel. The shaft C of the bolting-reel has an extended enlargement, *e*, between the location of the sleeve *c* and the head of the reel, and the said enlargement is provided near each end with four metal plates, e' e^2 e^3 e^4, which are equidistant from each other, and are each provided with a central enlargement or seat, which is provided with a threaded opening. A rod, *f*, has its lower end threaded to engage the opening in the plate e', while a rod, *f'*, likewise has one end threaded to engage the opening in the plate e^3, and occupies a position diametrically opposite the rod *f*. The free end of each rod *f f'* is reduced to

present a shoulder, upon which bears a plate, *g g'*, having a perforation, in which the reduced portion bears. Each plate *g g'* has each of its ends rigidly secured to the inner face of semi-cylindrical ring-sections *h h'*, each of which is provided with a tongue located between the plates *g g'*, which overlap the corresponding tongue of the other ring-section, and practically both of said half-sections present a complete ring.

i refers to a plate, which is mounted loosely on each of the rods *f f'*, and is arranged in a position transverse to that occupied by the reel-shaft C. Also rigidly secured to each of the threaded rods *f f'*, immediately above the plate *i*, is a ratchet-wheel, *i'*. At each end of said plate *i'* is pivoted a pawl, i^2, the position of which is such that when the plate *i* is vibrated (on the pivoted bearings presented by the engagement of the rods *f f'* with the perforated plates on the shaft C) the said pawl will alternate with the other pawl in becoming engaged and disengaged with the teeth of said ratchet-wheel, thus insuring at all times the engagement of either one pawl or the other, and resulting in their mutually operating to continuously rotate said ratchet-wheel tooth by tooth. Each rod *f f'* is threaded throughout its length, and upon said threaded portions, above the ratchet-wheel *i*, is located a second plate, *j*, similar to the plate *i*, but having a threaded opening to adapt it to traverse the said threaded rod when the latter is revolved. The plate *j* is likewise provided with two pawls, *j'*, the office and function of which are identical with that of the pawls i^2, inasmuch as a ratchet-wheel, j^2, is located on the said threaded rod adjacent to the plate *j'*. A plate, *k*, is located on each of the threaded rods adjacent to the ratchet-wheel j^2, and said plate has a threaded opening at each end for the reception of one end of a rod, *k'*, the outer end of which is beyond the ring-section of the inner reel, and is provided with a shoulder to form a supporting-bearing for one end of a plate, k^2, similar to the plate *k*. The said plate k^2 has a central perforation for the reception of the reduced end of a short stub-rod, *l*, the said reduced portion forming the shoulder by which said rod bears on the plate k^2. The upper end of said rod *l* is reduced for the engagement of an opening formed centrally in a curved spring, *l'*, having its ends rigidly connected to the interior face of one of the half-sections *m* of the rings of the outer reel. The outer reduced portion of the rod *l* also presents a shoulder upon which the said spring *l'* bears. The plates e^2 e^4 likewise form bearings for two rods similar to the rods *f f'*, and carrying a double series of plates, ratchet-wheels, and pawls, in all respects similar to the arrangement described with relation to said rods *f f'*. With regard to the rods bearing in the plates e^2 e^4, the general arrangement differs, in that the spring-plates *g g'*, instead of being rigidly connected to the interior face of the ring-sections of the inner reel, bear against them, and are slotted and retained in place by means of pins *n*, bearing in said ring-sections and extending into extended slots formed in the ends of said springs. Each tongue or overlapping portion of each ring-section has pivotally secured at the point where said tongue terminates a curved rod, *o*, the outer end of which is hooked to engage a pin, *o'*, located on the inner face of said tongue near its farther end. A bracket, *p*, is secured on each of the tongues, so as to extend over the adjacent tongue of the other section, and each bracket has a vertical portion, *p'*, which, when each of the rods *o* is hooked in position, will be engaged by the rod of the other tongue, so as to enable said bracket to slide along the rod, but preventing lateral starting or disengagement of the said tongue. By this arrangement each ring is permitted to expand or contract radially, as may be desirable. The sections of the rings of the outer reel are likewise tongued, and are connected together by means the same as the arrangement for connecting the sections of the rings of the inner reel, and a particular description thereof will not be necessary. Four radial rods are rigidly mounted on the shaft C adjacent to the inner end of the sleeve *c*, and each rod has pivotally secured thereon a pair of plates, *s s'*, the free end of each of which is perforated for the attachment of a cord or wire, s^2. The cords or cables of the plate *s'* are extended and connected to pins s^3, located on the upper end of the plate *i*, each pair of cords or cables s^2 being connected to all of the plates *i* on one side of the shaft C. The cords or wires of the plate *s* are likewise connected with the outer end portions of all the plates *j* on one side of the shaft C.

D refers to a clamp, which is composed of two sections, D' D^2, which are hinged together and have their free ends bent parallel and provided with threaded perforations for the passage of a threaded pin, D^3, by means of which said clamp is rigidly secured on the shaft C. The said clamp is provided with a series of inclined threaded perforations adapted for the threaded horizontal end portion of a series of inclined braces, E, the outer ends of which are bent horizontally and perforated for the passage of threaded pins, which secure said braces to the head-ring of the inner reel. The annular metal plate E' of the head is secured to said inner head-ring by means of suitable brackets, while the outer head-ring is secured to said face-rings by means of light brackets. The head-ring of the outer reel is provided at intervals on its interior face with a series of yoke-brackets, F, which are perforated to receive the threaded ends of a series of threaded rods, F', the inner ends of each passing through slots in the head-ring of the inner reel, being rigidly retained by means of securing-nuts.

In practice the several plates *s s'* are vibrated to cause all the plates *i* and *j* to be likewise vibrated independently or together,

as may be desired, so that the ratchet-wheels $i' j^2$ are turned by means of the pawls $i^2 j'$, the turning of the inner ratchet-wheels resulting in feeding the threaded rods $f f'$ outward from the reel-shaft, and thus expanding the sections composing the ring of the inner reel, which movement is readily permitted by reason of the tongue and slotted connections of said sections at opposite points, as before referred to, the pin n also contributing to such movement by playing in the extended slot of the springs opposite such connections. The turning of the wheel j^2 results in causing said wheel to travel outwardly on the threaded rod and move the plates k in the same direction, which, by reason of their rod-connection with the springs l' of the outer plates, enables them to also expand the ring-section of the outer reel. Of course, such adjustments only affect the position and conditions of the central rings of the inner and outer reel. After such central rings have been adjusted annular gaskets are placed upon the ring-sections of the said central rings of the inner reel. The bolting-cloth of the inner ring is then placed around the head-ring section, the mesh of the said cloth being parted to permit the passage of the rod F', which retains the clamping-ring F^2 upon the said head-rings by means of nuts located on said rods. The said bolting-cloth is then adjusted around the central rings of the inner reel, so as to bear upon the gaskets of the same, which maintain the cloth out of contact with the metal rings, and the tail end of said cloth is caused to surround the tail-ring d' of the inner reel, and is held thereon by means of a clamping-ring, F^3, which embraces said tail-ring and has its free end portions bent parallel with each other and perforated for the reception of a threaded securing-pin, to adjust said clamping-ring, in a manner similar to that shown and described in my patent aforesaid. The meshes of the bolting-cloth are separated on the tail-ring, so as to allow the threaded pins which secure the ends of the brace-rods d to likewise pass through said bolting-cloth and prevent the accidental removal of said cloth from between said rings and the clamping-rings. After connection is made with the tail-rings the collar C^2 is then revolved on the threaded sleeve c', so as to be advanced in the direction of the tail end of the shaft C, which expands and stretches the bolting-cloth of the inner reel to its proper degree. The bolting-cloth of the outer reel is then placed around the head-rings of said outer reel and its meshes parted sufficiently to enable it to be engaged by the pins F', that secure said head-rings to the face-rings of the reel. A clamping-ring, F^4, similar to F^3, but of larger dimensions, is then caused to embrace the cloth on the head-ring, by means of which it is rigidly and securely held at the head of the outer reel. The cloth is then adjusted upon the outer central rings and upon the tail-ring, after the manner pursued with relation to the cloth of the inner reel, and after connection has been made with the tail-ring the sleeve c' is revolved on the sleeve c in the direction of the tail of the shaft, so as to distend and strain the bolting-cloth of the outer reel to its proper degree.

The device by which the grain is fed to the reel is located on the inner face of the end of the bolting-chest adjacent to the head of the reel, and the said device consists of a cylindrical case, which is composed of upper and lower portions, G G', hinged together at one side and suitably secured at the other side. A pipe or conduit, G^2, establishes connection between the section G' and a supply-opening in the top G^3 of the chest. A band, G^4, is arranged horizontally, and is secured at one side to the inner edge of the section G', and the said band is centrally embraced by a yoke-strap, G^5. A plate, G^7, rests transversely upon the band. Two small vertical shafts, G^8 G^9, have their bearings in the horizontal portions of said straps and in the plate G^7, and each carries a series of pins or agitators, G^{10}. Each of said shafts G^8 G^9 projects sufficiently above the plate G^7 for the attachment of a gear-pinion, G^{11}, which pinions mesh with and are driven by a third pinion, G^{12}, located intermediately between said pinions G^{11}, and mounted on an axis, G^{13}, bearing in the plate G^7, and in a second plate, G^{13}, arranged immediately above the plate G^7, but maintained sufficiently distant therefrom by means of blocks G^{14} to permit a bevel gear-wheel, G^{15}, to be rigidly secured on said axis G^{13}.

It will be noted that the head portion of the reel-shaft C is located within the cylindrical plane of the section G G', so that a gear-wheel, G^{16}, rigidly secured on said shaft, will engage with the gear-wheel G^{15}, and will drive the agitators through the motion of the reel.

The cleaning device is secured to the under face of the top of the bolting-chest, and is located immediately above the reel. By referring to Figs. 1 and 2 it will be seen that on the under face of the top are secured four pairs of hangers, H H' H^2 H^3, the four hangers H H' being arranged in parallel pairs near one end of the top, and the hangers H^2 H^3 being likewise arranged near the other end of the top. Each pair of hangers has bearing therein a shaft, I I', the inner end of which shaft extends sufficiently toward the center of the chest to permit the half-section J J' of a drum to be secured thereon, part of said sections conjointly forming a drum, which is split or separated at the center. Each drum-section J J' is embraced by an annular radial flange, J^2, which is connected to its respective drum-section by means of brackets J^3, the horizontal portions of which bearing on the drum-sections being slotted to enable them, with the flange, to be adjusted longitudinally on the drum-section. The shafts I I' are retained permanently in the hangers by means of short straps K. A belt, L, passes around the two drums presented by the several sections, and the said flanges on the sections are

so adjusted with the belt that the belt will be properly and centrally guided thereby. The said belt is provided longitudinally with a slot, L′, which is of such length that it extends from one drum to the other, and is so located that it registers with the split portions of said drums.

Secured on the outer face of the belt L, adjacent to one end of the slot L′ and near the outer edges thereof, is a pair of eyes, L^2, which form the bearing for the ends of the horizontal rod L^3, arranged transversely across the belt and slot L′ thereof, and the said rod L^3 has hung therefrom a slotted plate, L^4, in the slot L^5 of which plays a grooved roller, L^6, centrally perforated for the passage of the transverse horizontal portion L^7 of a yoke-bar having its side portions, L^8, bent downwardly and then inwardly, to engage and suspend rectangular blocks L^9. Each of the said rectangular blocks L^9 has projecting from its side, near one end, a threaded bolt, L^{10}, designed to pass through the vertical slotted portion L^{11} of the brush handle or tongue L^{12}, on the free end of which is located a brush, L^{13}. The nut L^{14} clamps the vertical slotted portion against the side of the rectangular block. It will be noted that the brushes of the respective blocks L^9 L^9 extend in different directions, so that as the reel revolves there will be no liability of both brushes acting on the same circumferential surface, a spiral brush action being secured instead. Each block L^9 has two perforations extending longitudinally through it, the said perforations being arranged one above the other, and through these perforations pass guide-wires L^{15}, which are secured at each end to bolts L^{16}, secured on a horizontal plate, L^{17}. It will be understood that each plate L^{17} carries four bolts, in order that the four guide-wires L^{15} of both blocks L^9 may be secured thereto.

M M refer to two vertical parallel rods, the ends of which are bent horizontally to pass through the head-section of the chest, and engage nuts on the outer side of said head, by means of which said rods are retained rigidly in position. Horizontal loops or eyes M′ extend rearwardly from the head-plate L^{17} and embrace the vertical portions of the rods M, in order that the said plate L^{17} may have a vertical slide movement upon said rods. By vertically moving said plate L^{17} upon said rods and passing a horizontal rod through one of the series of perforations M^2 formed in said rods, the plate L^{17} may be supported at any desired point on said rods.

The plate L^{17} arranged at the tail of the chest is in all respects similar to the plate L^{17} located at the head. The tail-plate, however, instead of being connected to vertical rods M, is provided with a horizontal extended threaded rod, N, which passes through the elongated vertical slot formed in the vertical plate N′, which is secured at its upper and lower ends to the outer face of the upper and middle timbers, *a a′*, of the tail of the chest, and the projecting threaded portion of said rod is designed to be engaged by a hand-winch, N^2, adapted to clamp the rod in position at any point of the vertical slot in the plate N′.

The outer end of the shaft I′, located near the tail of the chest, is provided with a bevel gear-wheel, O, meshing with a second gear-wheel, O′, arranged at right angles thereto on the end of the shaft O^2, suitably suspended by depending and horizontal hangers secured to the top and adjacent side of the chest, and the other end of said shaft O^2 projects sufficiently beyond the end face of the tail of the chest to carry a band-pulley, O^4, which is belted with a band-pulley, *b*, on the end of the reel-shaft.

In operation, the inner and outer reels having been adjusted to the desired tension, and the brushes having likewise been adjusted vertically by raising and lowering and securing the reels and other plates upon their adjustable connections, the meal or flour is fed down to the cylindrical case composed of the sections G G′, from which it passes into the band containing agitators, which latter by their rapid revolution serve to discharge the grain, in the form of a fine spray, into the inner reel, the revolution of which serves to sift or bolt the chop, so that the flour and meal pass through to the outer reel, and bran, chaff, and other coarse particles being retained in the inner reel and ultimately discharged therefrom at one end to any suitable conduit or receptacle provided therefor. The flour and meal are then sifted by the outer reel, the meshes of the cloth of which are of much finer character and quality, thereby serving to pass the flour through to the bottom of the bolting-chest, while the meal is passed off from the outer reel at one end thereof. During the period in which the foregoing operations take place the drums composed of the sections J J′ are rotated, so as to continuously rotate the belt. As illustrated in Fig. 2, if the belt be rotated in the direction indicated by the arrow, the rod L^3 will exert attraction upon the slotted plate L^4, and thereby, by reason of the pulley-and-yoke connection, pull the blocks and their brushes in the same direction. Now, when the pin L^5 passes around the tail-drum to the under side of the belt, the plate L^4 dives down with said pin into the split portion of the ring. As the belt continues to move along with the pin L^5, the plate L^4 drops downward beneath the belt, causing the roller L^6 to occupy the other end of the slot L^5. Then the parts continue to move along, carrying the brushes in the opposite direction until the other pulley or drum is reached, at which point the motion of the brushes ceases, by reason of the pin L^5 having run to the end of the motion in that direction, after which it passes around said drum and at the same time moves to the other end of the slot of the plate L^4, and carries the same along in a different direction, in the manner first described. From the foregoing, therefore, it will be apparent that the operation of the machine is such that the chop

in its untreated condition is properly delivered to the inner screen, the action of which, in connection with the outer screen, is such as to partially screen and bolt the material, separating it from its impurities, and that the meshes of the cloth of the outer screen are at all times preserved in the free and open condition by the action of the brushes traveling back and forth upon its upper surface. Furthermore, the brushes are at the top of the reel, where they will in no way interfere with the free passage of the flour through the cloth of the outer reel.

I do not herein claim, broadly or separately, the improved cleaning device herein described, illustrated, and set forth, as the same forms the subject-matter of a separate application for Letters Patent, filed September 4, 1885, and bearing Serial No. 176,426.

I claim—

1. The combination, with a supporting-shaft, of a series of rings concentric with said shaft, and each ring composed of two sections, devices, substantially as described, for radially adjusting said sections, a bolting-cloth mounted on said rings, and an outer series of rings supported upon said shaft, and a bolting-cloth secured around said outer series of rings, substantially as set forth.

2. The combination, with a bolting-reel mounted on a central shaft, of a feed device comprising two vertical shafts, G^8 G^9, a series of radial horizontal pins, G^{10}, mounted thereon, and gearing for revolving said shafts G^8 G^9, substantially as set forth.

3. The combination, in a bolting-reel, of a series of rings forming part of the frame thereof, and each composed of independent sections, devices for adjusting said rings, brushes L^{13}, and blocks L^8, wires L^{15}, plates L^{16}, and accessories for adjusting said brushes, substantially as set forth.

4. The combination, in a bolting-reel, of a central shaft, a series of rings concentric therewith, and each composed of two sections, a series of plates carried by the shaft, a radial series of rods supported in said plates, springs at their outer ends bearing against said ring-sections, one of said springs being slotted at each end, and pins projecting from the ring-sections into said slots, substantially as set forth.

5. The combination of a shaft, the sectional supporting-rings and cloths of an outer reel and an inner reel, both concentric with and mounted on said shaft, adjustable rods f f', ratchet j^2, rods k', and accessories for radially adjusting said reels, tail-rings for the outer and inner reels, and devices, as described, for effecting the longitudinal movement of said tail-rings, substantially as set forth.

6. The combination, with a central shaft, of the supporting-rings and cloths of an inner reel and an outer reel, tail-rings for said inner and outer reels, the threaded sleeve c', playing on said sleeve c, and having a shoulder, c^3, a ring, c^4, bearing against said shoulder and connected to the outer ring, and a sleeve, c^2, also provided with a shoulder, and a ring bearing against said shoulder and connected to the inner ring, substantially as set forth.

7. The combination, in a bolting-reel, of a central reel-shaft and a series of plates located thereon, a series of rings each composed of independent sections, a radial series of threaded rods engaging said plates, springs on said rods bearing against independent sections of the inner reel, a plate playing on each of two or more of said threaded rods, a spring supported from each plate, ring-sections for an outer reel, against which said springs bear, and devices, substantially such as set forth, for effecting the radial outward and inward movement of said threaded rods and plates, as and for the purpose specified.

8. The combination, in a bolting-reel, of a central shaft, a ring composed of independent sections, the adjacent ends of which are cut away to form tongues, rods pivoted on said tongues and hooked at their free ends to engage pivots on said tongues, and brackets secured on each tongue to engage the rod of the other tongue to form a slide-connection for the tongues, and devices for radially adjusting said rings.

In testimony whereof I affix my signature in presence of two witnesses.

HUGH P. CAVANAUGH.

Witnesses:
JOHN J. WOODS,
J. M. COX.