(No Model.) 3 Sheets—Sheet 1.

W. F. MAISH.

BOLTING REEL.

No. 567,569. Patented Sept. 8, 1896.

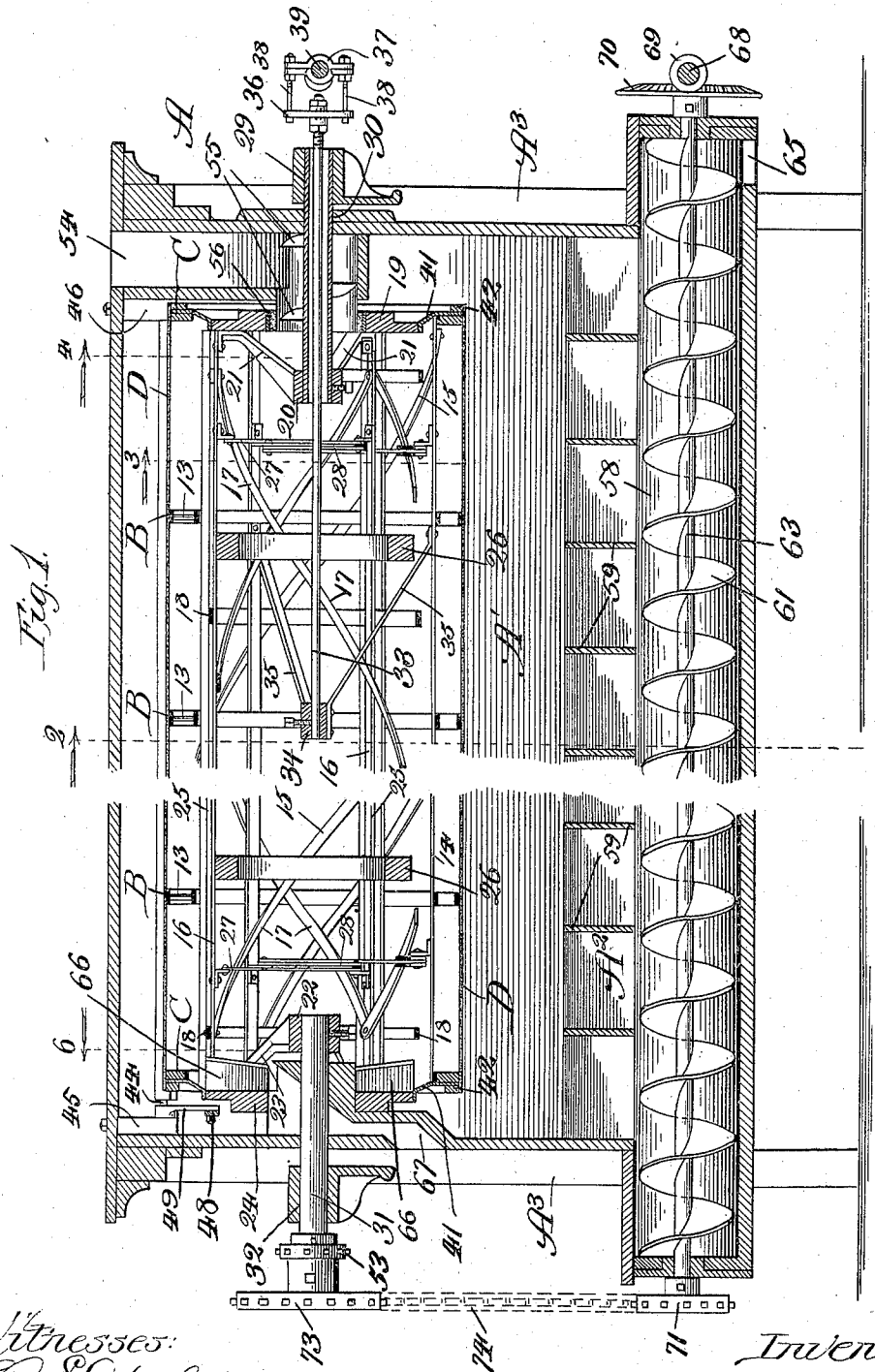

Fig. 1.

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(No Model.) 3 Sheets—Sheet 2.

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BOLTING REEL.

No. 567,569. Patented Sept. 8, 1896.

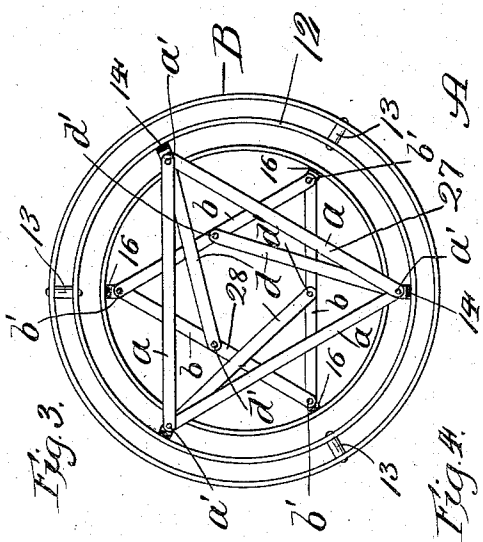

Fig. 3.

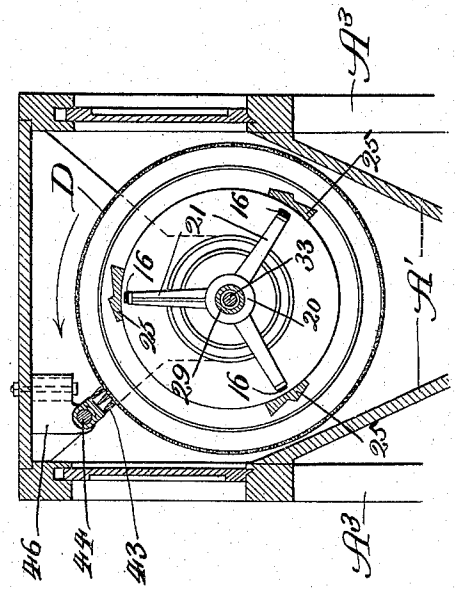

Fig. 4.

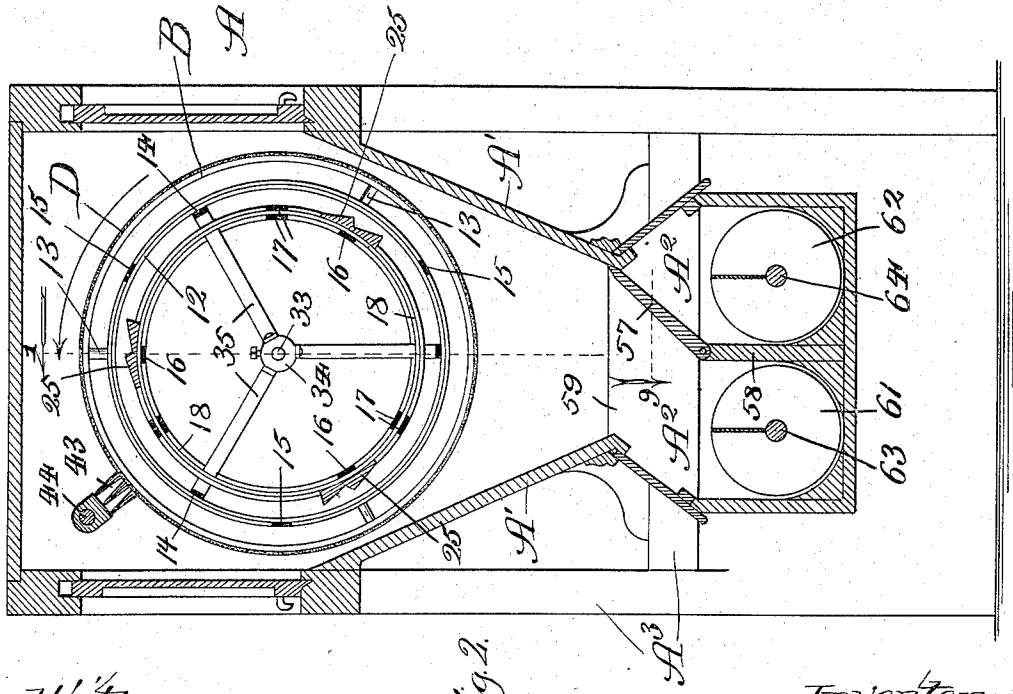

Fig. 2.

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(No Model.) 3 Sheets—Sheet 3.

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BOLTING REEL.

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Fig. 5.

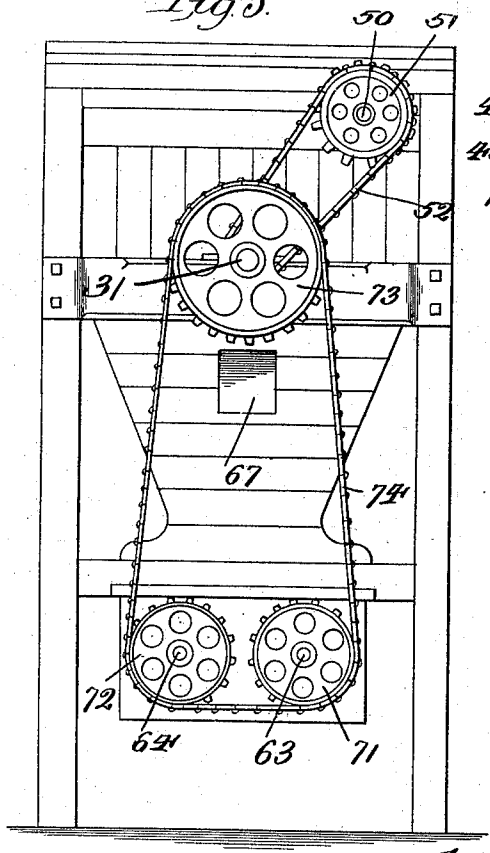


Fig. 6.

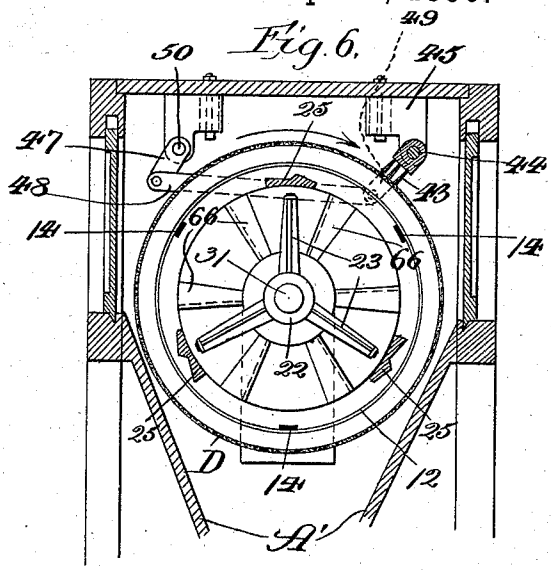


Fig. 7.

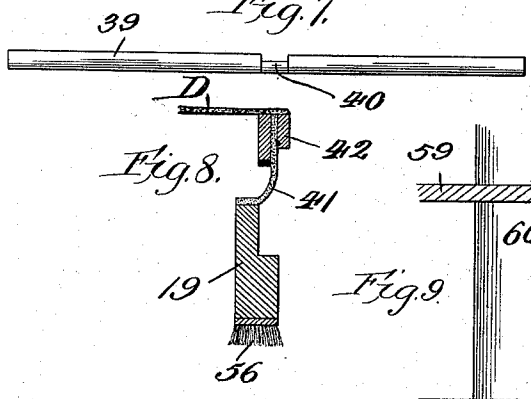
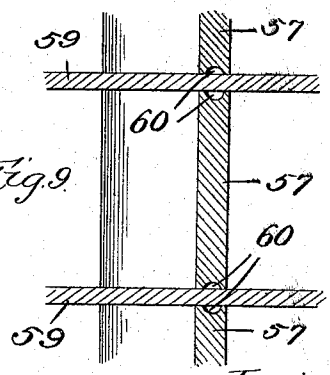


Fig. 8.

Fig. 9.



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UNITED STATES PATENT OFFICE.

WILBUR F. MAISH, OF WARSAW, INDIANA, ASSIGNOR TO THE MAISH & GORTON MANUFACTURING COMPANY, OF SAME PLACE.

BOLTING-REEL.

SPECIFICATION forming part of Letters Patent No. 567,569, dated September 8, 1896.

Application filed August 7, 1895. Serial No. 558,505. (No model.)

To all whom it may concern:

Be it known that I, WILBUR F. MAISH, a citizen of the United States, residing at Warsaw, in the county of Kosciusko and State of Indiana, have invented certain new and useful Improvements in Bolting-Reels, of which the following is a full, clear, and exact description, that will enable others to make and use the same, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to improvements in bolting-reels, and more especially that class of reels used in flour-bolts for milling purposes; and it consists of certain novel features in the construction, combination, and arrangement of the several parts as will tend to provide a more efficient device of this character than has been produced heretofore.

In the drawings, Figure 1 is a vertical longitudinal section of a reel structure, on line 1, Fig. 2, looking in the direction indicated by the arrow, which embodies my improved features; Fig. 2, a vertical transverse section on line 2, Fig. 1; Fig. 3, a transverse section on line 3, Fig. 1; Fig. 4, a broken-away transverse section on line 4, Fig. 1; Fig. 5, an end elevation; Fig. 6, a broken-away transverse section on line 6, Fig. 1; Fig. 7, a detached detail of an eccentric shaft; Fig. 8, a sectional part of the reel-head at the receiving end; and Fig. 9, a broken-away horizontal sectional detail on line 9, Fig. 2.

Referring to the accompanying drawings illustrating the invention, A represents the casing, inclosing the bolting-chamber and having the inwardly-inclined sides or sloping walls A′ A′, which conduct the bolted material into the conveyer-chambers A^2 A^2, and A^3 represents supporting-frame bars.

The reel structure is of a cylindrical form in cross-section, and consists principally of a light framework of steel ribs and rings or hoops so arranged as to provide a light framework, combining strength and durability and a certain amount of elasticity. A number of outside steel rings B, disposed at intervals, and the end rings C, usually of wood, support the bolting-cloth D, which is stretched over and properly attached thereto. Inside of the rings B is another series of trussing-rings 12, the two series being connected by a number of studs 13, leaving an annular intervening space, as more fully shown in Fig. 3. The rings 12 are connected by a number of longitudinal ribs 14, Figs. 1, 2, 3, and 4, the respective ends of which are secured to the end rings C. A number of spirally-arranged ribs 15 take a course that carries them over (Fig. 2) some of the rings 12 and have their respective ends secured to the longitudinal ribs 14 near the ends. The structural arrangement might be said to consist of two cylindrical bodies, an inner and an outer one, the outer one consisting of the bolting-cloth and the parts to which it is directly attached, the inner one forming a trussed skeleton frame and consisting of a number of longitudinal ribs 16, extending from end to end and disposed at intervals throughout the circumference, a series of spirally-arranged ribs 17, a number of bracing-rings 18, and a number of other parts, as will be described farther along, altogether forming the inner axial skeleton reel.

To a reel-head 19, located in the receiving or head end, is attached a bracket consisting of a hub 20 and a number of radial arms 21, as shown in Figs. 1 and 4. A companion bracket, consisting of a hub 22 and radial arms 23, is attached to reel-head 24, located in the opposite or tail end of the machine, as shown in Figs. 1 and 7. The respective ends of longitudinal ribs 16 are secured to the outer ends of the different bracket-arms. Outside of and in the same plane with ribs 16 are placed wooden bars 25, extending from one end to the other of the reel structure. The ribs 16 run along inside of rings 18 and the wood bars outside of the rings, as more clearly shown in Fig. 2.

The series of spiral ribs 17 of the inner supporting or trussing cylinder are riveted or otherwise secured together at intersecting points, their respective ends being fastened to the longitudinal ribs 16 near the respective ends thereof adjacent to the companion brackets.

The degree of pitch of the spirally-arranged ribs may be varied, so as to be greater or less than that illustrated, in accordance with the machine as a whole and the particular kind of work to be done; that is, more especially

with reference to the difference between a light or heavy load.

The series of ribs, both straight and spiral, and the trussing-rings may be of a greater or less number than that shown, as required in practical working. One of the particular objects to be attained in a structure of this character is the combining of great strength with that of lightness in the frame parts, so that the true cylindrical contour will be retained without being too rigid, and to this end the ribs and rings are ordinarily constructed of the best quality of steel. The different parts are arranged in such relative position as to afford a mutual support and produce the effect practically of a truss throughout the entire skeleton reel structure. The inner reel-frame may be further strengthened by two or more wooden rings 26, Fig. 1.

The outer and inner cylindrical reel-frames are connected by companion compound springs 27 and 28, Fig. 3, which are usually located adjacent to the respective ends of the reel structure, as shown in Fig. 1. Each of these springs consists of three bars, arranged in the form of an equilateral triangle, and a number of connecting-braces. These springs are of different dimensions and are arranged in the relative position shown, providing six points of attachment alternating with reference to the outer and inner reel-frame. The larger spring 27 consists of three bars *a a a*, joined together at their meeting ends, as at *a'*, and secured to the longitudinal bars 14, connecting rings 12 of the outer reel structure. Triangular spring 28 consists of three bars *b b b*, joined together at their meeting ends, as at *b'*, and secured to longitudinal ribs 16, connecting rings 18 of the inner reel structure. The attaching-points of the companion springs alternate with reference to the outer and inner reel-frames, as shown, so as to equally distribute the action of the same. The two springs are connected by spring-braces *d d d*, the outer ends of which are attached to the joining ends of the larger spring and the inner ends connected, respectively, to the longitudinal center, as at *d'*, of the three bars composing the lesser spring. These springs, when necessary, have a slight yielding action, but are sufficiently rigid to preserve the true cylindrical contour of the reel-frames. This method of connecting the two reel-frames secures a positive unitary action not attainable under the ordinary arrangement in structures of a like character. A hollow axial shaft 29 is located in the head end of the reel, the inner end stopping short in hub 20 of the bracket rigidly secured to this end of the reel-head. This end of shaft 29 is rigid to its bearing-hub, the outer end being provided with a suitable journal-bearing in the inclosing casing, as at 30, Fig. 1.

The axial reel-driving shaft 31 is located in the tail end of the machine, the inner end being rigidly secured in hub 22 of the head-supporting bracket at this end. The outer projecting end of the driving-shaft is journaled in the casing, as at 32. A rod 33 is inserted through the hollow axial shaft, the inner end being rigidly secured in a fixed hub 34, supported in place by a number of diagonal braces 35, the inner ends of which are attached to the hub and the outer ends to longitudinal bars 14, Figs. 1 and 2. The outer projecting end of rod 33 has a cross-bar 36 mounted thereon, to the respective ends of which is connected a journal-box 37, Fig. 1, by a pair of adjusting-bolts 38. A rotatable eccentric shaft 39 is journaled in box 37. This shaft is shown detached in Fig. 7, and is cut out on one side, as at 40, to bring the bearing part to one side of the center and produce the required eccentric action when rotating, which has the effect of imparting to rod 33 a reciprocating endwise movement, and this movement has in turn the effect of imparting to the outer reel-frame a limited vibratory endwise action through the medium of the connections before described. Thus it will be understood that the outer reel cylinder-frame to which the bolting-cloth is attached has a vibratory action simultaneously with that of its rotary movement, which produces an effect similar to that of a shaking sieve motion and shakes the flour material to and through the bolting-cloth, the same shaking action also floating the fluffy material and carrying it along to the tail end of the machine, where it is discharged. This arrangement not only greatly facilitates the operation, but likewise increases the working capacity, so that a smaller machine will do the work of a much larger one of the ordinary construction and action. It will be readily understood that the vibratory motion keeps the fine particles of flour next to the cloth, and floats away the lighter matter separated therefrom. This vibration or endwise-shaking action of the outer reel-frame also greatly assists in keeping the meshes of the bolting-cloth free, and generally combines to produce the best possible results. The construction and connections are such as to impart a vibratory action to the outer portion of the reel-frame alone, the inner reel-frame having a rotary motion only.

The respective end rings C of the outer cloth reel-frame have a flexible hinged connection 41, Figs. 1 and 8, with the respective reel-heads. The outer edge of these hinged connections is secured to the end rings C by a clamping-ring 42, the inner edge being secured to the respective reel-heads. These hinged connections may be of canvas-cloth, leather, or any other material that is suitable for the purpose, and provides for the vibratory or endwise-shaking action of the outer reel-frame. A brush 43, Figs. 2 and 6, is located inside of and supported from the top part of the casing. This brush runs the whole length of the machine and has an oscillatory action and intermittent contact with the exterior surface of the bolting-cloth. The brush is mounted on a rock-shaft 44, the respective

ends of which are supported in bracket-bearings 45 and 46, Figs. 4 and 6, bolted to the top of the casing, as shown. On one end, Fig. 6, of this rock-shaft is rigidly mounted a crank-arm 47, to the extended end of which is pivotally connected one end of a link 48. The opposite end of this link is pivoted, Figs. 1 and 6, to a swinging arm 49, which is rigidly mounted on the inner end of a rotatable shaft 50 journaled in the casing at this point. On the outer projecting end of shaft 50 is mounted a sprocket-wheel 51, which receives a rotary movement from the reel-driving shaft through the medium of belt 52, running over a sprocket-wheel 53, Fig. 1, mounted on said shaft. By this arrangement an oscillatory or rocking action is imparted to the brush which serves the purpose of clearing the meshes of the bolting-cloth and brushing away any adhering particles. The material to be operated upon is received into the machine through an opening 54 in the head end of the machine and is conducted inwardly by a spiral or conveyer flight 55 formed on the periphery of the hollow axial reel-shaft.

The inclosing wall of the inlet-passage through reel-head 19, surrounding the hollow shaft, is provided with a lining 56 of sheepskin, the woolly side outward, as shown in Fig. 1 and in the sectional detail Fig. 8. The object of this lining is to prevent the dust thrown off by the material being worked from backing out through the intake. Any soft fleecy substance may be substituted for the sheepskin.

Above the conveyer-chambers A^2 A^2 are located a number of valves 57, Figs. 2 and 9, which are pivoted at their lower ends to a central partition 58, dividing the conveyer-chambers longitudinally. These valves may be, by reason of their pivotal connection, thrown over to either side, so as to divert the bolted material into either one of the conveyer-chambers. These valves are arranged the whole length of the machine and are divided each from the other by partitions 59. These valves and parts are usually made of wood, and therefore liable to shrink and not always close tightly. To remedy this feature, the valves are provided on their respective edges with grooves 60, into which the flour will drift and fill whatever space there may be between the valves and adjacent walls and form a seal, thus preventing any of the bolted material from passing into the chamber that has been cut off and making the separation complete.

Companion spiral conveyers 61 and 62 are located in the respective chambers and are mounted on shafts 63 and 64, respectively, which are provided with journal-bearings in the ends of the inclosing casing, as illustrated in Fig. 1. The material is discharged from the conveyer-chambers through an opening 65.

The material not passing through the bolting-cloth is carried along to the tail end of the machine and is picked up by a series of buckets 66, secured to and revolving with the reel-head at this end, and is discharged through a passage 67, Figs. 1 and 5, opening out through the casing. A main driving-shaft 68, Fig. 1, extends across the lower head end of the machine, and is provided with suitable journal-bearings and belt-pulleys. (Not shown.) This driving-shaft belts with the motive power and transmits the required motion to the conveyers, the bolting-reel, and to the eccentric shaft, imparting an endwise movement to the outer reel-frame. A pinion 69 is mounted on driving-shaft 68, Fig. 1, and engages with a gear-wheel 70, mounted on the outwardly-extended end of conveyer-shaft 63. On the opposite extended end of this conveyer-shaft is mounted, Figs. 1 and 5, a sprocket-wheel 71, a companion sprocket-wheel 72 being mounted on the corresponding end of conveyer-shaft 64. A sprocket-wheel 73 is mounted on the outer end of the reel axial shaft 31. These three sprocket-wheels are connected by a belt 74. By this arrangement the required motion is transmitted to the different parts.

I do not confine or limit myself to the precise construction and arrangement of mechanical details as herein set forth, but may make such changes and alterations as come within the province of the skilled mechanic without departing from the spirit of my invention.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a bolting-reel, the combination of an outer cylindrical reel-frame, an inner cylindrical reel-frame, and the compound triangular springs, connecting said reel structures, substantially as described.

2. A bolting-reel, comprising in its structure an outer cylindrical reel-frame, consisting of a number of longitudinal ribs, a number of spirally-arranged ribs, and a number of rings, an inner cylindrical reel-frame, consisting of a number of longitudinal ribs, a number of spiral ribs and a number of bracing-rings, connected at their intersecting points, and the compound triangular springs, connecting said reel-frames, substantially as described.

3. A bolting-reel, comprising in its structure an outer cloth-supporting reel-frame, an inner trussing reel-frame, and the compound triangular springs, the points of one alternating with those of the other, and the points of one secured to the outer, and those of the other to the inner reel-frame, substantially as described.

4. A bolting-reel, comprising in its structure an outer cloth-supporting reel-frame, an inner trussing-frame, the reel-heads, the companion brackets, secured thereto, and the compound triangular springs, connecting the outer and inner reel-frames, substantially as described.

5. A bolting-reel, comprising in its structure an outer cloth-supporting reel-frame, an inner reel-frame, the compound triangular springs, connecting said reel-frames, and means for imparting a vibratory or endwise-shaking action to the outer reel-frame only and simultaneously with the rotary movement of both reel-frames, substantially as described.

6. In a bolting-reel, a compound spring, consisting of two equilateral triangles of different dimensions and joined together so that the points of one alternate in position with reference to the points of the other and adapted to be secured to circles of different diameters, substantially as described.

7. In a bolting-reel, a compound spring, consisting of two equilateral triangles having their points arranged in alternate positions, and the spring-braces connecting the spring-bars, substantially as described.

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