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M. W. CLARK.

FLOUR BOLT.

No. 492,914. Patented Mar. 7, 1893.

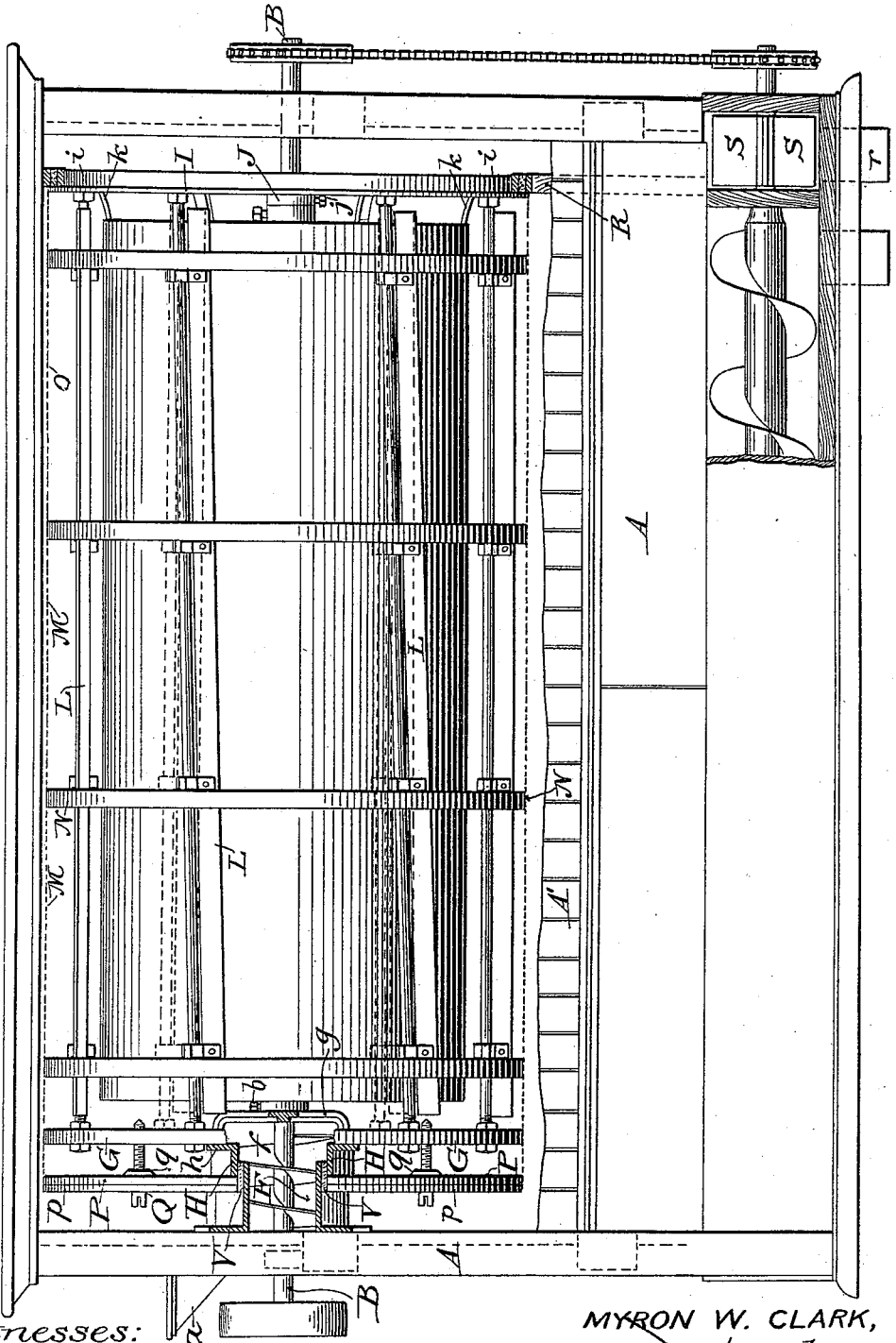

Fig. 1.

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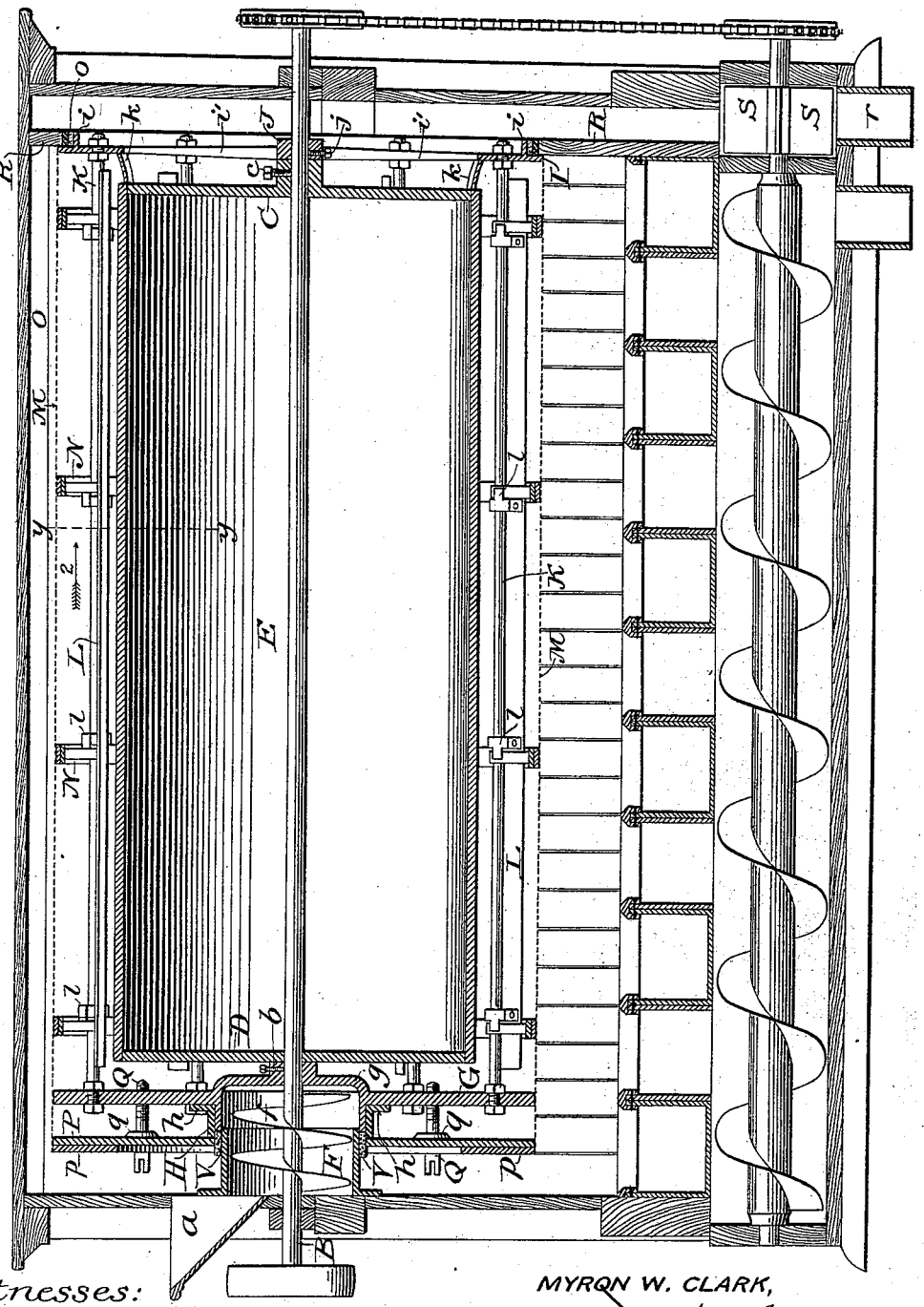

Fig. 2.

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FLOUR BOLT.

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Fig. 4.

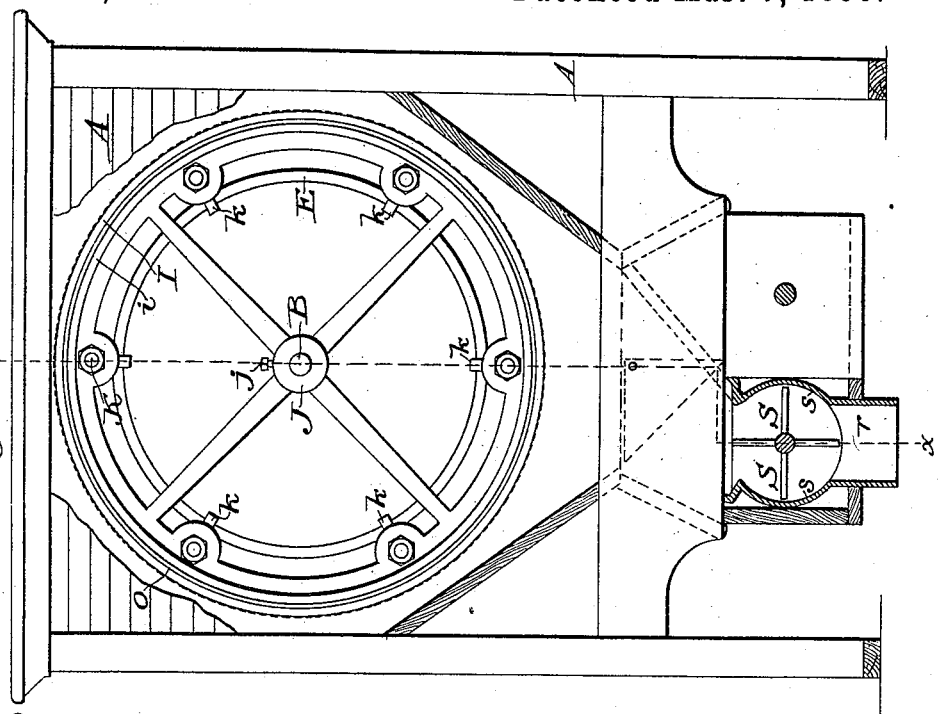
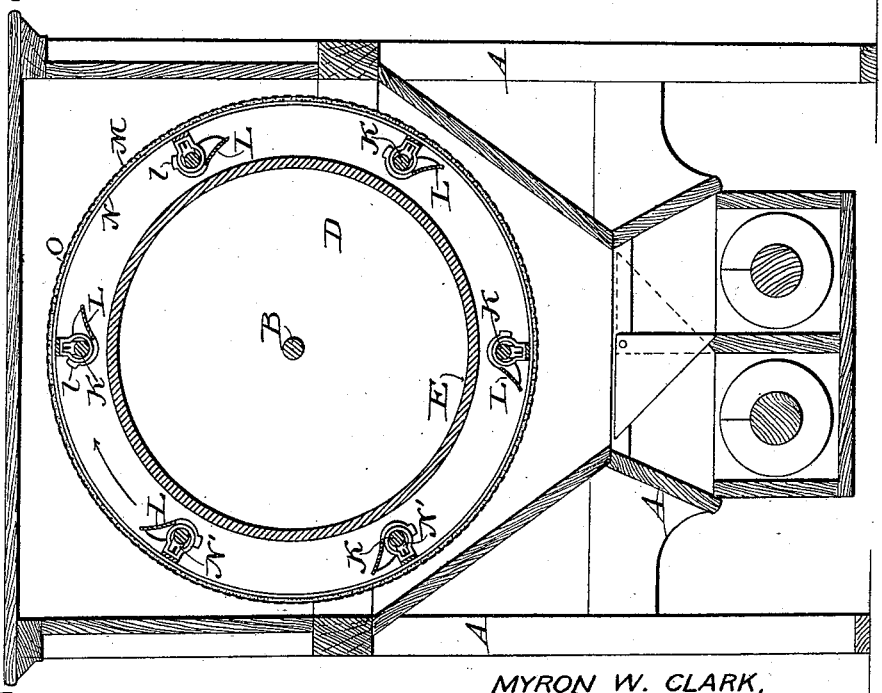


Fig. 3.



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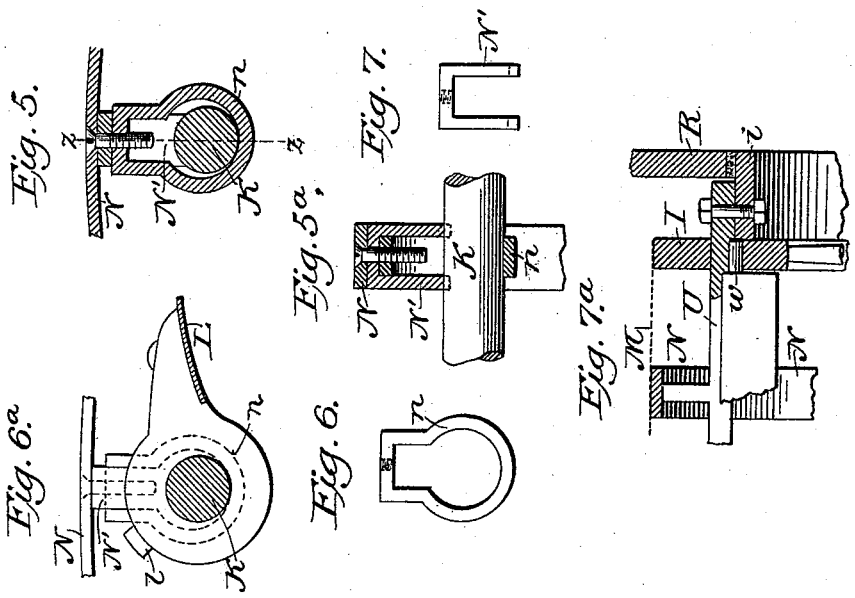
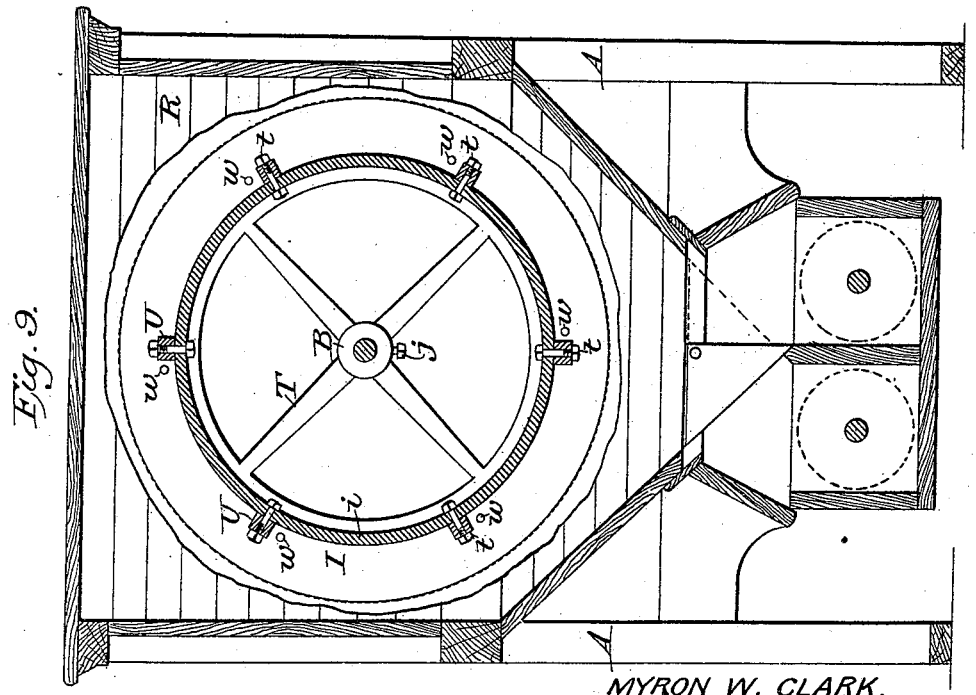
FLOUR BOLT.

No. 492,914. Patented Mar. 7, 1893.





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(No Model.) 5 Sheets—Sheet 5.

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FLOUR BOLT.

No. 492,914. Patented Mar. 7, 1893.

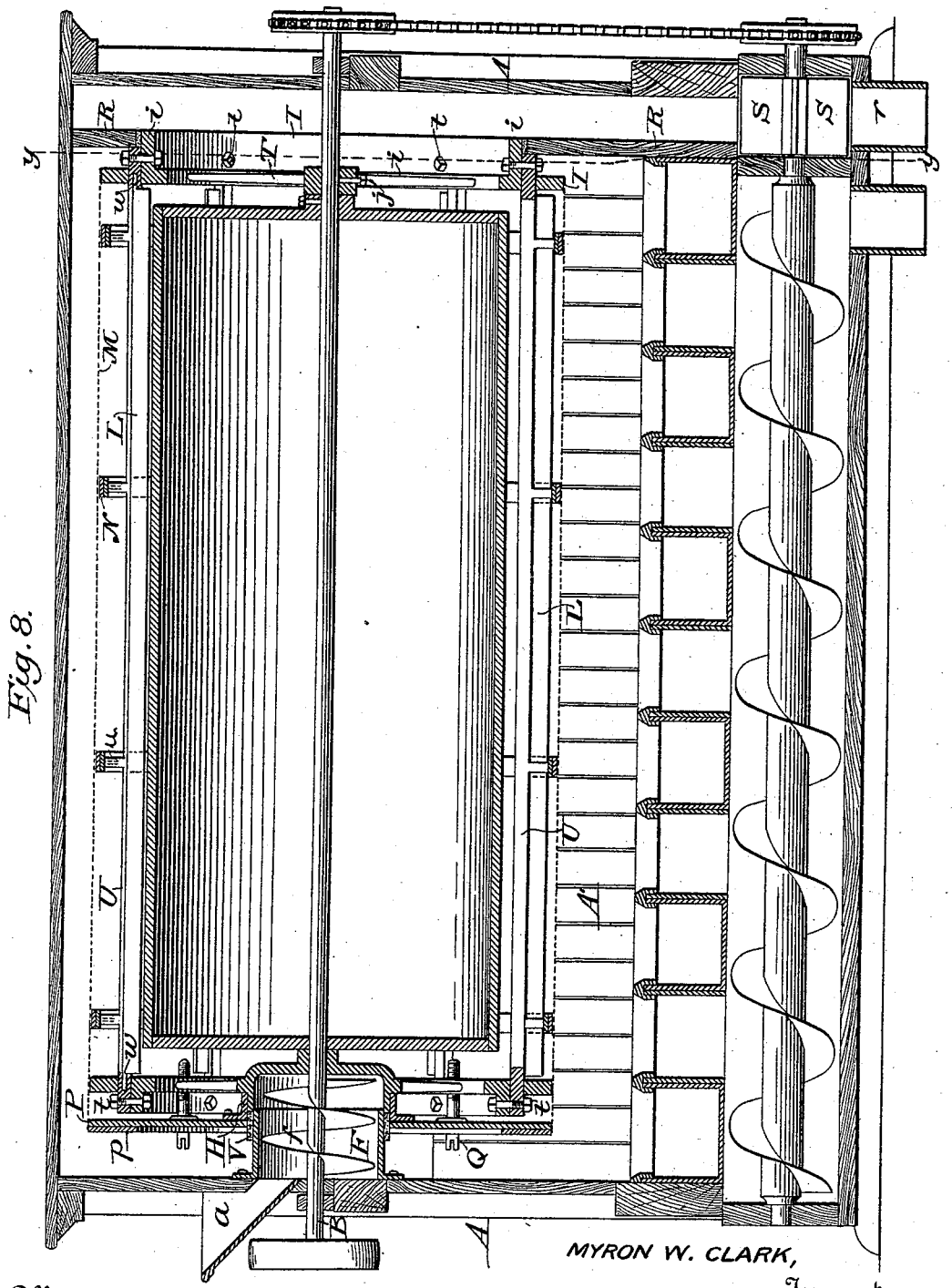

Fig. 8.

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UNITED STATES PATENT OFFICE.

MYRON W. CLARK, OF PARMA, MICHIGAN, ASSIGNOR, BY MESNE ASSIGNMENTS, OF ONE-HALF TO THE EDWARD P. ALLIS COMPANY, OF MILWAUKEE, WISCONSIN.

FLOUR-BOLT.

SPECIFICATION forming part of Letters Patent No. 492,914, dated March 7, 1893.

Original application filed November 18, 1886, Serial No. 219,319. Divided and this application filed January 24, 1893. Serial No. 459,550. (No model.)

To all whom it may concern:

Be it known that I, MYRON W. CLARK, a citizen of the United States, residing at Parma, in the county of Jackson and State of Michigan, have invented certain new and useful Improvements in Flour-Bolts, of which the following is a specification.

My invention relates to flour bolts, and consists in certain improvements hereinafter set forth, the present application being a division of one filed by me on the 18th day of November, 1886, designated by Serial No. 219,319.

Figure 1 is a side elevation of a flour bolt embodying my invention, parts of the casing being broken away to show the structure, part of the bolting cloth of the reel being omitted. Fig. 2 is a longitudinal section taken on the dotted line *x*—*x*, of Fig. 4. Fig. 3 is a vertical transverse section. Fig. 4 is a rear elevation, parts of the casing being broken away. Figs. 5, 5ª, 6, 6ª, 7 and 7ª, are detached views of the bearers which support the cloth hoops or rings. Fig. 8 is a transverse vertical section of a modified embodiment of the invention. Fig. 9 is a vertical section on line *y*—*y* of Fig. 8.

The object of this invention is to utilize a much greater portion of the bolting cloth than is customary with slowly moving reels of the ordinary construction; and it consists in certain new constructions and combinations of parts, as will be hereinafter set forth.

Like letters of reference indicate like parts in all the figures.

A, A, represents generally the frame-work and casing, within which the operative parts of the bolt are located.

B is the central driving shaft, mounted in suitable bearings and having a belt pulley fastened upon it.

Within the bolting cloth there is a closed drum or hollow cylinder which I will describe. Of this drum, C is the head nearest the tail end, that is the discharging end of the bolt. The drum head has a central sleeve, with a set screw, *c*, for securing it to the central shaft B. D is a similar head at the receiving end of the bolt, and which may be secured to the shaft B, when desired, by a key or set screw.

E is a shell mounted upon the drum-heads which it fits closely at either end. This shell may be of sheet metal, wood, or other suitable material,—and its surface may be circular in cross section, or ribbed or corrugated as shall be desired or found advantageous according to the circumstances of the case.

I will describe the structure of the reel which surrounds the drum.

F is a short cylinder section or tube, supported at the head end of the bolt, into which opens a hopper or feed spout, *a*.

f, is a worm mounted on shaft B to feed the material from the hopper, *a*, through the tube section F, and thence into the reel.

G, *g*, is the reel head at the receiving end of the bolt; *g*, *g*, being arms which connect the centrally open flange portion with a hub surrounding the shaft B, and secured thereto by a set screw *b* or other equivalent device.

At the tail end of the reel there is a ring, flange, or centrally open disk, I, with a rearwardly projecting flange *i;* the outside diameter of the part I being the same as the outside diameter of the reel head G, *g*. Thus the part I is adapted to serve as a separate ring for one end of the bolting cloth.

J is a hub, mounted on shaft B, to which it is secured and preferably made adjustable thereon by a set-screw, *j*, for a purpose which will be hereinafter explained. Of course the hub and flange are connected by means of spokes.

k, *k*, are inclined arms projecting forward and inward from the flange I, to the drum head C, which arms may be made to partially support the said flange. It is not indispensable that these arms be integral with both the ring and the drum head. In fact, some of the adjustments can be facilitated by making these parts in two pieces, so that one can be rotated about the central shaft independently of the other.

K, K, are stay rods, screw-threaded at their outer ends and passing through the reel head G, *g*, and the flange I, to which parts they are firmly secured by means of nuts; there being by preference two nuts at either end of each of the stay rods, as indicated in Fig. 2.

L, L, are elevators mounted on the stay rods by means of centrally open carriers sur-

rounding the stay rods, part or all the carriers surrounding the stay rods being provided with laterally projecting lugs, *l*, for a purpose which will be explained.

The bolting cloth is indicated at M, and is supported intermediate of its ends upon a series of cloth hoops or rings N, N, whenever the length of the bolt is such as to make one or more supports of this character desirable. In Figs. 1 to 7, each cloth ring is mounted upon the stay rods by means of interposed bearers, each bearer consisting, in this instance, of a stirrup ring, *n*, the circular part of which has an inside diameter a little greater than the outside diameter of the stay rod, and has a screw-threaded hole in the outer angular portion. The saddle part N′, has the ends of its legs concaved to fit the stay rods. The hole in the upper flat part of the saddle registers with the screw-threaded hole in the angular part of the stirrup and receives a bolt or screw which passes through a countersunk hole in the cloth ring or hoop, whereby these parts are firmly held together in proper working relation to each other and to the stay rods.

The bolting cloth at the tail end of the reel is turned down over the outer edge of the flange I, toward the rearward projecting flange *i*, against which it is clamped by a strap or band O, or a cord or other suitable device. At the forward or head end of the bolt and between the reel head G, *g*, and the casing, there is a cloth tightener, consisting essentially of a metal ring P, having a wooden ring *p*, attached to its front face to receive the front end of the bolting cloth, which is tacked thereto.

Although I propose to make the parts P, *p*, of different materials, yet they constitute essentially a single movable and adjustable ring, of which the wooden part is specially adapted to have one end of the bolting cloth attached to it.

Q, Q, are bolts, screw-threaded at their inner ends where they are seated in the reel head G, *g*. Each bolt is provided with a flange or shoulder, *q*, engaging with the inner face of the ring P, through which the outer end of the bolt projects; so that by turning these bolts in the proper direction, the ring P, *p*, can be moved forward or outward from the reel head and the bolt cloth thereby properly stretched, this cloth-tightener ring and the adjacent reel head being of substantially the same diameter,—as will be readily understood without further explanation.

R is a partition, a short distance inside the tail end of the casing. This partition has a central opening to receive the rearwardly projecting part *i* of the flange, and the space between the flange and the partition may be packed with wool or its equivalent, to prevent leakage at this point.

The space between the partition R and the tail end of the casing, constitutes a tailing chamber, which is hopper-bottomed, as indicated in Fig. 4,—and opens into a trap, consisting essentially of revolving wings, S, S, which run in close proximity to the surrounding walls *s*, *s*, in such manner that the tailings are discharged downward through the spout *r*, while the wings effectually intercept air currents which otherwise might pass through the spout.

In setting up and operating this bolt, I propose to fasten the drum securely to the central shaft, then place the reel head G, *g*, and the flange I, loosely on the shaft; the elevators are then placed on the stay rods and the ends of the rod inserted in the reel heads and the flange, after which the reel heads and flange are firmly fastened to the shaft, B. Preferably, I locate the head G, *g*, with its flange part about five inches from the front end of the drum; and to prevent leakage I attach a ring H, *h*, to the reel head. The ring is provided at its inner edge with a vertical flange *h* for this purpose, and the space between the ring and the shell F of the feeder is packed, as shown at V, preferably with sheep skin with the wool attached, which fills the annular space between the ring and the shell. When it is desired, the elevators may be arranged somewhat spirally relative to the bolting cloth and the drum before the reel head and the ring are permanently attached to the central shaft. In case the ring or flange I, and the inclined arms *k*, *k*, are made integral with the drum head C, the spiral direction of the elevators may be regulated by turning the reel head G, *g*, upon the shaft B; but when these parts are not made integral it may be found more convenient to regulate this spiral arrangement by turning the flange I and its hub upon the shaft after the reel head G, *g*, has been secured to the shaft. When preferred, however, the arms *k*, *k*, may be omitted. By preference, the bearers which are interposed between the cloth rings and the stay rods are so located relatively to the swinging carriers to which the elevators are attached, that the projecting lugs *l* of the carriers shall engage with the bearers and limit the oscillation or swing of the elevators about the stay rods. The conveyers are driven from the shaft B by means of chains or belts traversing sprocket wheels or pulleys, as indicated in Fig. 1.

When the bolt is in operation material is fed in through the hopper *a*, and thence through the shell, the worm, and the openings between the arms *g*, *g*, of the reel head, to the bolt cloth.

As the cloth, the elevators, and the drum revolve in the direction indicated by the arrow in Fig. 3, part of the material is caught by the elevators on the upward moving side of the bolt and discharged therefrom on the outer surface of the drum, whence it is returned to the bolting cloth,—some of it going over the drum and being delivered to the bolting cloth on the downward moving side of the bolt. Part of the material which is

carried over the top of the drum is delivered to the bolting cloth at a comparatively short distance below the highest point of the drum; owing in part to the centrifugal action upon the material, which is produced by the action of the drum.

It will be readily understood from an examination of Fig. 3 that the relative positions of the elevators and of the downwardly inclined surface of the drum, as also the relative positions of the elevators and the bolting cloth, are such as greatly to facilitate the bolting or sifting action, because they assist in properly directing the material around the inner surface of the bolting cloth and in contact therewith not only upon the upward moving side of the reel, but also upon its downward moving side. That is to say, as shown in Fig. 3, the elevators have their outer or free edges set away from the bolting cloth sufficiently to afford a space between the cloth and the elevators wide enough to permit a part of the chop, meal, or flour to fall back from the elevators to the cloth and to descend over the ascending side of the reel. So too, a quite wide space is left between the elevators and the drum, so that the elevators may not interfere with the movement of material over the surface of the drum.

The thickness of the cloth hoops and the covering applied thereto, as plainly shown in Figs. 2, 3, and 8 would of themselves give sufficient space for a considerable back-flow of material; but the proper working of the reel is best assured by keeping the elevators out of contact with the hoops, which may be done by proper arrangement of the stops on the elevator clips or carriers.

In operating this bolt, it will be found that with a proper speed of rotation, say about thirty revolutions per minute for a reel of thirty-six inches in diameter, the material will be sifted through the cloth on both the upward moving side and the downward moving side up to a line drawn horizontally through the reel about half way between its axis and its highest point. Thus nearly the whole area of the bolting cloth will be made available for bolting purposes.

While on some accounts I prefer to use a cylinder shaped drum, yet I do not wish to be limited thereto; because its surface might be corrugated, ribbed, or troughed, as is sometimes done in this class of bolts. Nor do I wish to be limited to the use of a drum which rotates in the same direction with the reel,—nor to one having the same speed as the reel.

In Figs. 8 and 9 I dispense with the stay rods K, K, and bearers N′, *n*, for connecting the reel heads and supporting the cloth, and use instead thereof spiders T, T, firmly secured to the shaft B,—with bars U, *u* attached at their ends to the spiders by means of bolts *t*, *t*, or their equivalents. These bolts may pass radially through the ends of the bars into the peripheral flanges of the spiders; or arms to the outer ends of which the bars may be attached by means of bolts passing through the bars and the lugs on lines which are substantially at right angles to the radial lines on which the lugs are formed. In either event the bars should have outward projections or lugs, to which the cloth rings are bolted or otherwise secured; and by preference, the outer faces of the lugs are grooved to receive the cloth rings and thus assist in supporting them against displacement. In these figures, there is also a similar cloth-tightening ring P, *p*, and adjusting bolts Q, Q, which have their inner ends seated in either the arms or the flange of the spider at the head end of the bolt. In this modification, the packing ring H, is attached to and carried by the cloth-tightening ring P, *p*, there being of course a suitable packing material in the annular space between the ring and the shell of the feeder.

With the construction shown in Figs. 1 to 4, there is liability, in some cases, if the cloth does not fit tightly to the flange G of the reel head, of material passing between this flange and the bolt cloth, and then through the ring into the conveyer, and being mixed with material which has been bolted. To guard against such occurrence I propose to use a similar packing ring in connection with and attached to the tightening ring as is indicated in the drawings at H; and where this last referred-to packing ring is used it may be found advantageous to omit the packing ring H, *h*, from the construction shown in Figs. 1 to 4. In other words, the packing ring H, *h*, may be made fast either to the reel head or to the tightening ring as preferred, but there is obviously no need of using two such rings.

In the modified form shown in Figs. 8 and 9, the elevators L L are provided with pivots *w*, *w*, at their ends, these pivots being seated and turning in the flanges of the spiders, the arrangement of parts being such that the swinging edges of the elevators engage with the cloth hoops or other stops during part of each revolution of the bolt to pick up material, and as they move upward they automatically tilt inward and discharge the material upon the drum. While I have indicated a relative arrangement of these parts in Fig. 8 which will operate satisfactorily under ordinary circumstances, yet I do not wish to be limited thereto,—it being apparent that the point in the rotation of the bolt at which the elevators shall tilt inward and discharge their load may be varied by changing the position of the pivots toward or from the center of the reel, as may be found most advantageous under any particular circumstances or conditions.

Having thus described my invention, what I claim is—

1. In a flour bolt, the combination of a rotatable bolting reel, an imperforate drum within the reel, and a series of intermediate elevators carried by the reel for the purpose of discharging material upon the drum,—the

edges of the elevators being separated from the cloth of the reel.

2. In a flour bolt, the combination of a rotatable bolting reel, an imperforate drum within the reel, and a series of elevators between the reel and drum, the edges of the elevators being set away from the cloth of the reel and also from the surface of the drum.

3. In a flour bolt, the combination of a rotatable bolting reel, an imperforate drum within the reel, and a series of elevators carried by the reel, between the reel and the drum, the edges of the elevators being set away from the cloth of the reel and also from the surface of the drum.

4. In a flour bolt, the combination of a rotatable bolting reel, a smooth drum within the reel, and a series of elevators between the reel and drum, the edges of the elevators being set away from the bolting cloth and from the drum.

5. In a flour bolt, the combination of an external bolting reel, an internal drum, and tipping elevators between the bolting reel and the drum, and separated at their edges from both.

6. In a flour bolt, the combination of an external bolting reel, a smooth internal drum, and a series of tipping elevators between the reel and the drum, the edges of the elevators being set away both from the reel and from the drum.

7. In a flour bolt, the combination of an external bolting reel, an internal drum, and a series of tipping elevators between the reel and the drum, the edges of the elevators being set away from the reel.

8. In a flour bolt, the combination of an external bolting reel, a smooth internal drum, and a series of tipping elevators between the reel and the drum, the elevators being set away from the reel.

9. In a flour bolt, the combination of a rotatable bolting reel, an imperforate drum within the reel, and a series of elevators carried by the reel, between the reel and the drum, the edges of the elevators being set away from the cloth of the reel.

In witness whereof I hereunto set my hand in the presence of two witnesses.

MYRON W. CLARK.

Witnesses:

PETER GILBERT,

ROBT. G. EDMONDS.