No. 758,907. PATENTED MAY 3, 1904.

J. FRASER & A. G. MATHER.

SIEVE BOLTING MACHINE.

APPLICATION FILED JULY 15, 1903.

NO MODEL. 4 SHEETS—SHEET 1.

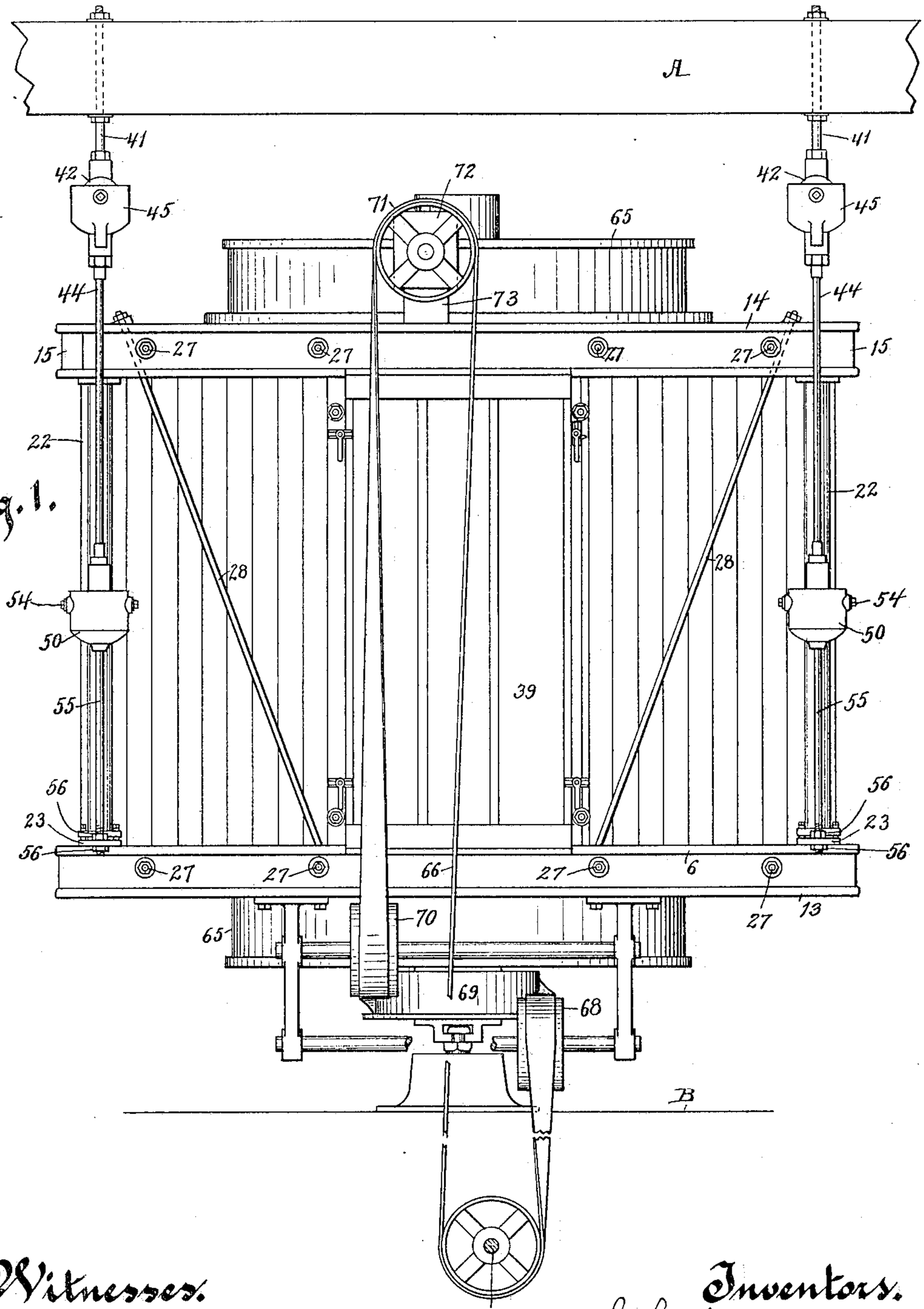

Fig. 1.

Witnesses.

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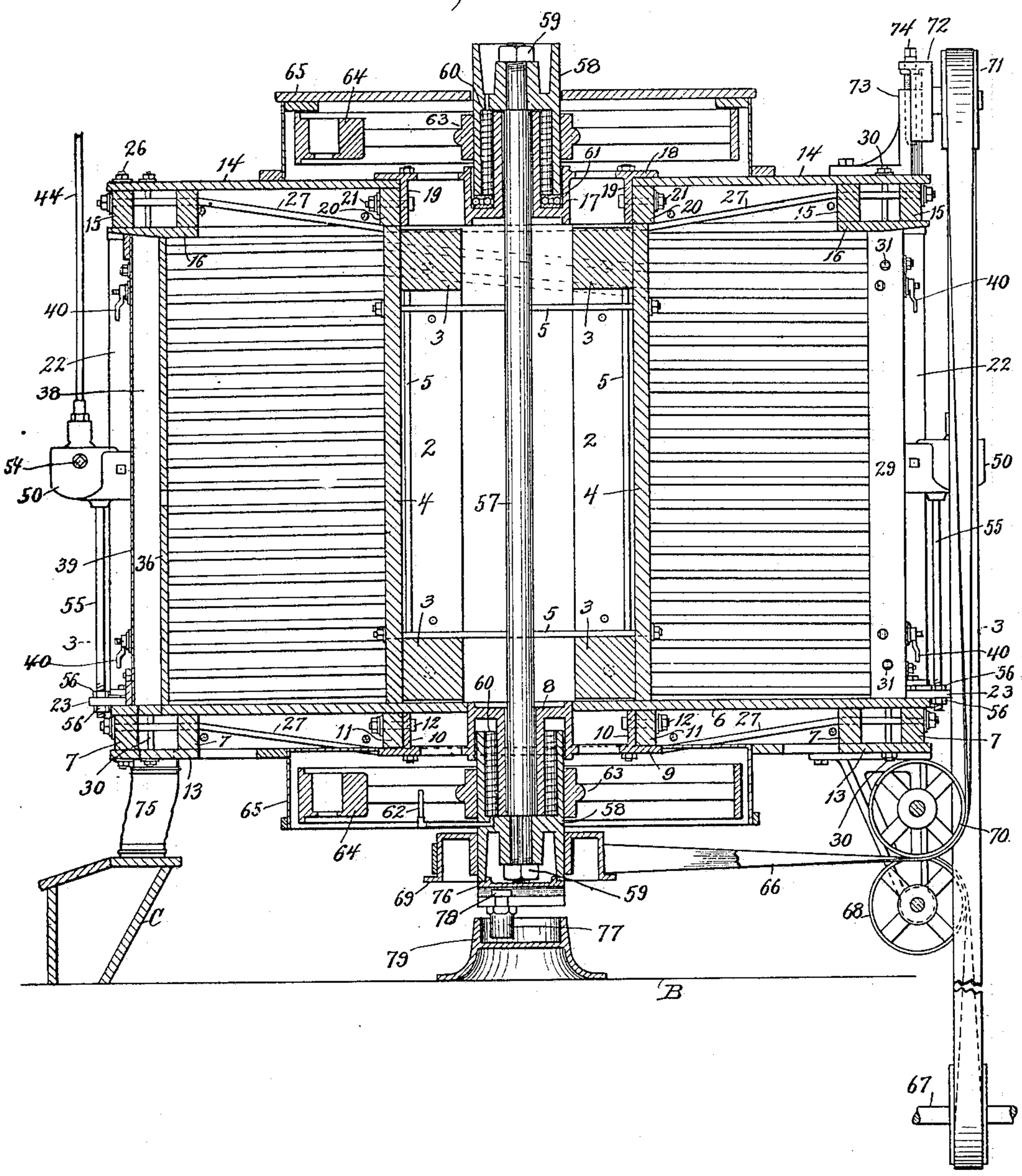
NO MODEL. 4 SHEETS—SHEET 2.

Fig. 2.



Witnesses.

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NO MODEL. 4 SHEETS—SHEET 3.

Fig. 3.

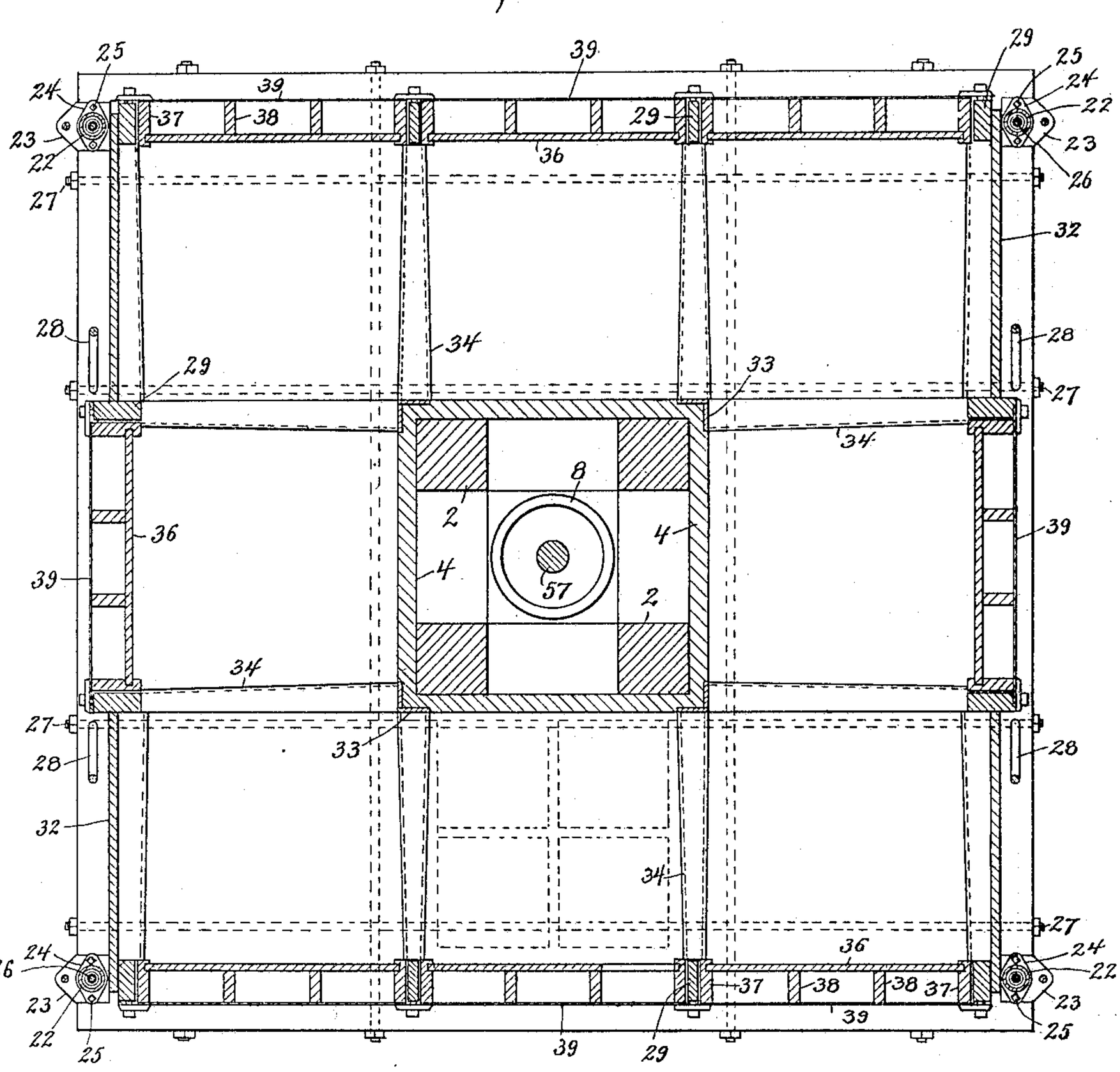

Fig. 4.

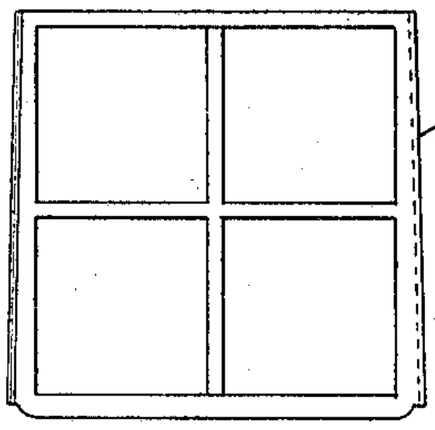

Fig. 5.

Witnesses.

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NO MODEL. 4 SHEETS—SHEET 4.

Fig. 6.

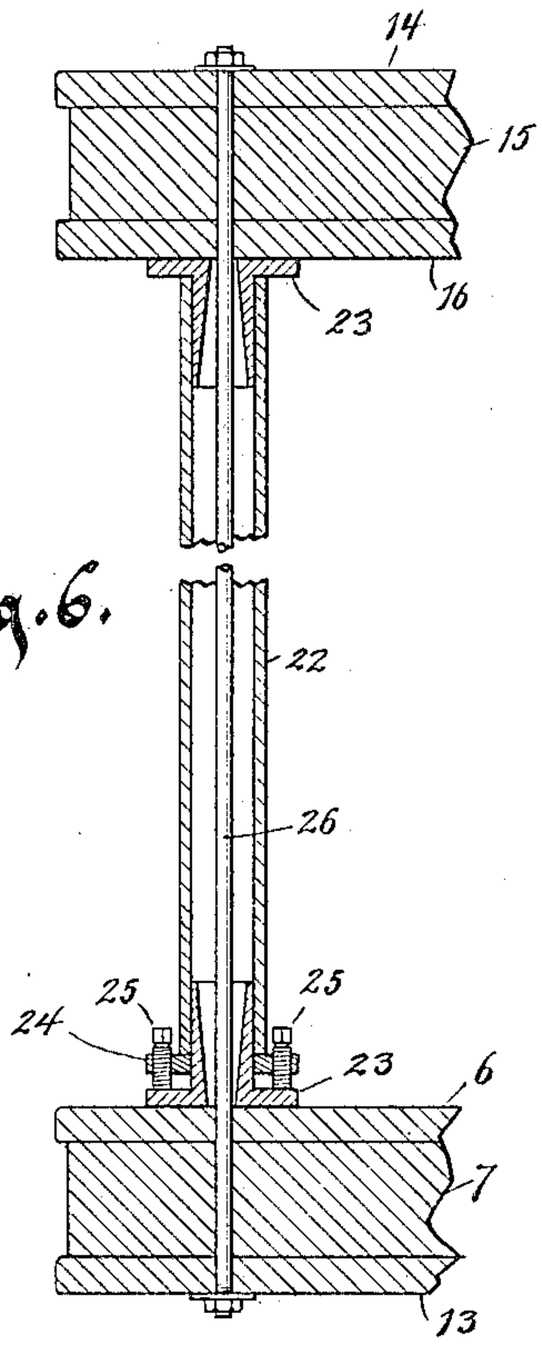


Fig. 7.

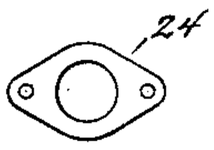


Fig. 8.

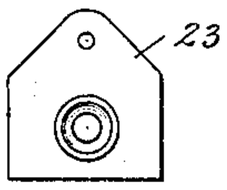


Fig. 9.

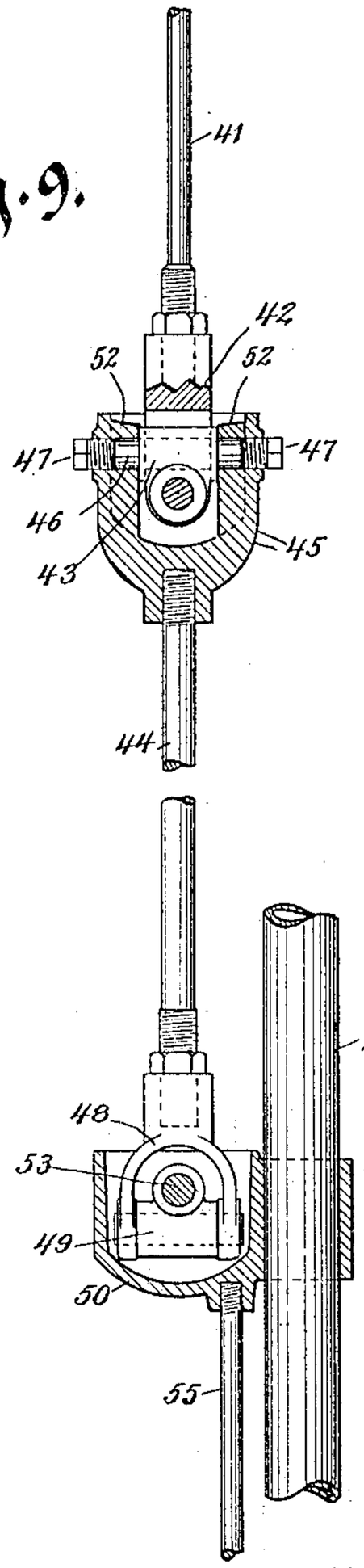


Fig. 10.

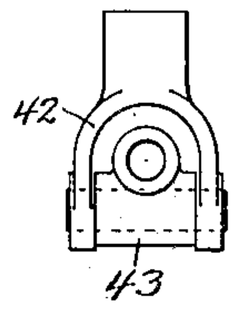
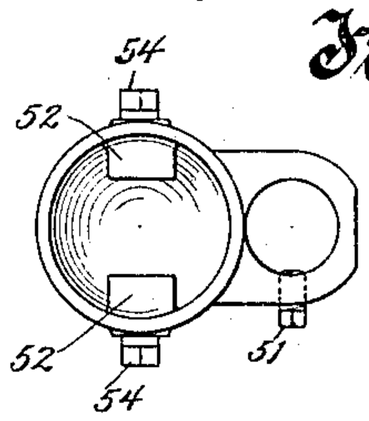


Fig. 11.



Witnesses.

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No. 758,907. Patented May 3, 1904.

UNITED STATES PATENT OFFICE.

JOHN FRASER AND ALLAN G. MATHER, OF MILWAUKEE, WISCONSIN.

SIEVE BOLTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 758,907, dated May 3, 1904.

Application filed July 15, 1903. Serial No. 165,617. (No model.)

To all whom it may concern:

Be it known we, JOHN FRASER and ALLAN G. MATHER, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented new and useful Improvements in Sieve Bolting-Machines, of which the following is a description, reference being had to the accompanying drawings, which are a part of this specification.

The invention relates to improvements in sieve bolting-machines in which a sieve-carrying frame is suspended and given a gyratory movement to cause the flour to fall through the sieves, of which usually there are a considerable number arranged in planes one above the other in the frame.

The object of the invention is to provide several novel and valuable features which herein are fully described and definitely claimed.

The invention consists of the machine, its parts, and combinations of parts, as herein described and claimed, or the equivalents thereof.

In the drawings, Figure 1 is a view of the complete machine. Fig. 2 is a vertical central section of the improved bolting-machine. Fig. 3 is a transverse section of the machine on line 3 3 of Fig. 2, the general construction only being shown in this section from which details of the construction are omitted. Fig. 4 is a plan of one of the sieves. Fig. 5 is a cross-section of a sieve on line 5 5 of Fig. 4. Fig. 6 is a section of a detail of the construction. Figs. 7 and 8 are details of the construction shown in Fig. 6. Fig. 9 illustrates partly in section means for suspending the frame movably and in connection therewith exhibits a novel feature of the construction. Fig. 10 is a detail of the construction shown more fully in Fig. 9, but at a right angle thereto. Fig. 11 is a plan view of a detail of the construction shown in Fig. 9.

In the drawings the sieve bolting-machine is shown as suspended in a proper manner in a mill. A beam A may be utilized to support the machine, and the floor B of the room in which the machine is located may be utilized to support a part of the mechanism.

In describing the invention it will be convenient to describe, first, the sieve-carrying frame; second, the means for suspending it so as to permit the frame, with the sieves therein, to be given a gyratory motion, and, third, to then describe the means by which the gyratory motion of the sieve-carrying frame is produced. Incidentally, minor features relating to or having connection with the principal features of the construction will be described.

In the sieve-carrying frame there is an interior framing consisting of posts 2 2, disposed in the corners of a rectangle, with rectangular sill-frames 3 3, one at the bottom and the other at the top, secured to the ends of the posts, and these are inclosed by side walls 4 4, all secured together by any convenient means, among which binding-rods 5 5 may be employed. About this interior framing an exterior framing is provided. A floor 6 is secured to the lower end of the interior framing and projects laterally therefrom and at its outer margins rests on a rectangular framing consisting, advisably, of two adjacent sills 7 7, extending entirely around the sieve-carrying frame and secured to the floor. A shaft-box 8, provided with a lateral flange 9 and a vertical flange 10, is secured to a rectangular frame 11 conveniently by means of bolts 12, the frame 11 being located beneath and advisably secured to the floor 6. A piece 13 underneath the sills 7 7 advisably extends inwardly somewhat from these sills and furnishes a support for the box or casing about the shaft load hereinafter described.

At the top of the sieve-carrying frame there is a floor or ceiling 14, corresponding in general construction to the floor 6, which rests on and is secured to sills 15 15, located at a little distance apart and extending in rectangular form about the sieve-carrying frame at the top and corresponding in general construction to the sills 7 7 at the bottom. A strengthening-piece 16 under the sills 15 is secured thereto. A shaft-box 17 is provided with a lateral flange 18 and a vertical flange 19 and by means of the vertical flange is secured to a rectangular frame 20 by means of bolts 21, which frame 20 is secured to the top of the interior framing. The shaft-box projects laterally over the ceiling 14, and this shaft-box

is secured to the interior framing and to the lower shaft-box conveniently by the vertically-disposed binding-rods 5 5.

For securing the lower sills 7 and the upper sills 15 to each other, and consequently the lower and upper members of the sieve-carrying frame to each other, hollow tubular pillars 22, one at each corner of the frame, are provided, and these pillars both at the top and bottom severally fit about the leg of a hollow foot-piece 23, which foot-piece has a lateral flange at one end that bears the one at the upper end against the strengthening-piece 16 and the other at the lower end against the floor 6. At the upper end the pillar 22 rests against the outer surface of the flange of the foot-piece 23, and at the lower end the pillar 22 rests on an adjustable foot-plate 24. Set-screws 25 25, turning through the foot-plate 24, rest on the flange of the lower foot-piece 23 and are adapted by their adjustment in the foot-plate to adjust the support of the pillar 22, thereby providing for lengthening or shortening the distance between the upper and lower frame members. The object of this is initially to adjust the pillar to the distance between the upper and lower members and thereafter to provide for taking up and adjusting the pillar to any shrinkage that may occur in the wood portions of the frame and to any possible sinking of the foot-pieces 23 into the wood of the frame. A binding-rod 26 is put through the pillar, the foot-pieces, and the upper and lower members of the frame for binding them together.

For strengthening the construction and providing means by which the interior framing can be lifted a little out of the horizontal plane in which it is originally built with reference to the exterior frame transverse truss-rods 27 27 are provided at the bottom and at the top and which truss-rods at the bottom pass under the frame 11 and through the shaft-box 8 and at their outer ends pass through and are anchored at a higher plane in the sills 7 7 and at the top pass under the frame 20 and through and are anchored at a higher plane in the sills 15. By this construction the truss-rods not only strengthen the construction, but on being tightened up by the nuts on their outer ends are adapted to lift the interior framing a little with reference to the exterior framing for the purpose of adjusting the sieve-supports at an incline. Also diagonal truss-rods 28 28 are employed connecting the upper and lower members of the sieve-carrying frame to truss up and hold the interior framing at a little higher elevation than the exterior framing, the diagonal truss-rods 28 being supplemental to and for similar purposes as the truss-rods 27.

In the sieve-carrying frame provision is made for the support of a number of series of sieves arranged in vertical order, there being in the machine shown in the drawings provision for eight vertical series of sieves—to wit, three vertical series on one side of the sieve-carrying frame, three on the opposite side, and one on each of the other sides intermediate between the corner series. For the support of these series of sieves a number of standards 29 29 are provided, which are secured in place in upright position between the floor 6 and the strengthening-piece 16 by bolts 30 30 through the strengthening-piece and floor below and through the ceiling and strengthening-piece above into the respective ends of the standards and turning therein in nuts 31 31, let into the sides of the standards in sockets therefor in position to intercept the bolts. On two sides of the sieve-carrying frame there are partial side walls 32 32, secured to adjacent standards 29 29. From these several standards 29, extending inwardly in a substantially horizontal plane to corner-pieces 33 33 on the corners of the interior framing, there are cleats or slideways 34 34 for the support and ready insertion and removal of the sieves 35, the frame of one of which sieves is shown in plan in Fig. 4 and in cross-section in Fig. 5. These slideways are arranged in pairs complementary to each other for receiving and supporting the sieves. A door is provided to close up the space in front of each series or stack of sieves in the sieve-carrying frame, which door consists of an inner wall 36, edge upright pieces 37, one or more intermediate uprights 38, and an outer sheet-metal wall 39. The walls are secured to the uprights so as to form a rigid door, and this door is held in place in the sieve-carrying frame conveniently by turn-buttons 40 40, secured to and swiveling on the sides of the sieve-carrying frame.

For supporting the sieve-carrying frame so that it can be adjusted to balance and level it up and to permit lateral movement we employ flexible shafts, preferably rods having one or more universal or gimbal joints. In the drawings we have shown such rods each provided with two universal joints. Four of these suspending-rods are employed, one at each corner of the sieve-carrying frame, the upper ends of which rods are secured to a suitable support, which may be beams like the beam A of the drawings, and at their lower ends are connected to the pillars 22. The upper member 41 of each suspension-rod is provided at its lower end with a furcate terminal 42, and a knuckle 43 is pivoted in the furcate terminal to rock in one direction. The other or lower member 44 of the suspension-rod is provided with a cup-shaped terminal 45, within which the furcate terminal 42 is placed and in which the knuckle 43 is pivoted, the pivot 46 being at a right angle to the pivot by which the knuckle is pivoted to the furcate terminal 42. The pivot 46 is held in place in the sides of the cup-shaped terminal 45 by screw-threaded plugs 47 47. The cup-shaped terminal 45 is adapted to hold lubricating ma-

terial therein for lubrication of the joint. At its lower end this lower rod member 44 is connected to the pillar 22 by a similar gimbal-joint consisting of a furcate terminal 48, a knuckle 49, and a cup-shaped bracket 50, which bracket encircles the pillar 22 and is slidable thereon vertically, being held in position thereon by a set-screw 51. The bracket 50, as well as the cup-shaped terminal 45, is provided with bosses 52 on the inner surface of the cup, which furnish strong supports for the pivot-pin, as well as bearings laterally for the knuckle. The pivot-pin 53 in the bracket 50 is held in place removably by screw-threaded plugs 54. The cup-shaped bracket 50 serves also as a means for holding a lubricant for the joint. The cup-shaped brackets 50 are held in position adjustably on the pillars 22 by rods 55, turning by screw-thread into the brackets, and at their lower ends secured to the foot-pieces 23 23, through which they pass, by nuts 56 56, turning on the rods above and below the foot-pieces. It will be understood that the sieve-carrying frame being suspended by universal jointed rods in the manner described is adapted for being given a horizontal gyratory motion, which is the motion especially adapted for the purpose for causing the stock, either flour or other material, to fall through the sieves of the sieve-stacks in the sieve-carrying frame.

For giving the sieve-carrying frame the required gyratory movement a shaft 57 is mounted vertically centrally in the sieve-carrying frame, the shaft having its bearings upon the boxes 8 and 17, hereinbefore mentioned. The shaft is provided at each end with an oil-holding hub 58, each of which hubs is pierced centrally by a contracted terminal portion of the shaft and is held thereto by a nut 59, turning on the end of the shaft. These hubs, respectively at the top and the bottom of the shaft, are substantially duplicates and interchangeable, except that a passage-way for the flow of oil as a lubricant through the hub is slightly different in one from that in the other. The hub 58 both at the top and the bottom of the shaft is made to surround a central part of the box 8 and 17, respectively, through which the shaft passes, and antifriction-rollers 60 60 are interposed between the hub and the box for securing the most free possible movement of the shaft in the boxes. These rollers are preferably of flexible coiled steel. At the top the hub 58 rests at its lower end on the upper plate of horizontally-disposed ball-runways 61, the lower plate of which runways rests on the box 17, whereby by means of the interposed balls ease of movement is secured in connection with the means for supporting the shaft and its load in the sieve-carrying frame. The upper extremity of the hub 58 is cup-shaped and is adapted to carry a supply of oil, which passes by a small duct through the bottom of the cup-terminal onto the rollers. The hub 58 at the bottom, which is of the same general form as the hub at the top, is provided with a laterally-extending and upwardly-turned oil-tube 62, which leads through a passage in the hub to the rollers 60 at their lower ends and is adapted to supply them with a suitable lubricant.

The shaft 57 is provided at one side with unbalanced loads near the top and the bottom, adapted by centrifugal action as it rotates to carry the shaft with the sieve-carrying frame around in a gyratory direction. These unbalanced loads on the shaft may be mounted thereon by any suitable means, conveniently by wheels 63, each having a load 64 thereon at the same side of the shaft. The weights are advisably inclosed by a case 65, secured to the sieve-carrying frame.

For rotating the shaft and its unbalanced loads and permitting the gyratory motion of the sieve-carrying frame the shaft is driven by a flexible belt 66, which runs on the pulley of a power-shaft 67, which in the present instance we have shown as located below the floor B. From the pulley on the power-shaft one line of the belt runs over a pulley 68, mounted on brackets fixed to the sieve-carrying frame, and thence on a pulley 69, fixed on the cup-like extension of the lower hub 58, and thence on a pulley 70, also mounted on the brackets on the sieve-carrying frame, and thence over a tightening-pulley 71, from which the other line of the belt runs directly to the pulley on the power-shaft 67. A particular location of the power-shaft and of the tightening-pulley 71 are not important, though it is desirable that one should be below the sieve-carrying frame and the other near the top or above the sieve-carrying frame. The pulleys 68 and 70 are so disposed that their axes are at a right angle to the axis of the pulley 69 on the shaft, and the tightening-pulley 71 must be mounted so as to permit of the adjustment of that pulley, whether it is mounted on the sieve-carrying frame or on some fixed support either above or below the sieve-carrying frame. For convenient adjustment of the pulley 71 as a tightening-pulley it is mounted on a stud-pin fixed in a block 72, which is adjustable on a bracket 73, fixed on the sieve-carrying frame by means of an adjusting-screw 74 and turning by its thread into the bracket 73. The block 72 is adjustable on ways therefor on the bracket 73.

The sieve-carrying frame for discharging the flour or stock therefrom is provided with flexible conduits 75, leading from the bottom of the frame to a spout C. In fact, there may be a number of such conduits. Also similar flexible conduits are employed for leading the material or stock to the sieves at the top of the frame, and these conduits (not shown) are usually connected to the sieve-carrying frame. When the machine is started and while it is being slowed down for stopping, there is al-

ways liability that the centrifugal action of the unbalanced loads on the shaft will gyrate the sieve-carrying frame to too great an extent and so as to be liable to tear or destroy the flexible stock-conduits. To obviate any such excessive movement of the sieve-carrying frame, we employ devices for limiting the extent of the gyratory movement of the sieve-carrying frame. For this purpose a head-piece 76 is secured to the outer end of the lower hub 58. This head-piece is provided with a transverse slot, and a stud-pin 77 is secured to the head-piece, adjustable laterally with reference to the axis of the shaft by means of a locking-screw 78 in such manner that the pin can be set either in the axis of the shaft or eccentrically thereto. A stop 79, having an open top of circular form, into which the pin 77 projects, is secured to the floor or other fixed support in such manner as to engage and prevent the movement of the pin 77 in any particular direction and in general to any greater extent than the size of the space therein into which the pin 77 projects. The transverse slot in the head-piece 76 extends across the axis of the shaft in the direction of the load 64, and the pin 77 is set in the slot at the center of gravity of the sieve-carrying frame when the load on the shaft is taken into consideration, so that under normal movement when not otherwise controlled by the load of stock on the sieves the pin 77 will remain substantially at the center of the stop-opening after the sieve-carrying frame gets into active rapid movement in a gyratory manner, the sieve-carrying frame moving in a gyratory manner about the axis indicated by the pin 77.

What we claim as our invention is—

1. In a sieve bolting-machine, a sieve-carrying frame comprising an upright interior framing, a distant exterior upright framing about but independent of the interior framing, sieves arranged one above another in a plurality of vertical stacks or series interposed between and supported interiorly on the interior framing and exteriorly on the exterior framing, a floor and a ceiling inclosing at the bottom and the top the space between the interior framing and the exterior framing, and means consisting of laterally-disposed rods at the bottom and at the top extending substantially horizontally from one side of the exterior framing to the other side thereof and secured adjustably at their respective ends in the exterior framing and inclined from each end slightly downwardly and supporting medially thereon the interior framing being adapted by being stretched or loosened for raising or lowering the interior framing and correspondingly the interior sides or ends of the sieves supported thereby.

2. In a sieve bolting-machine, a sieve-carrying frame comprising an upright interior framing having top and bottom sills, and distant exterior upright framing about but independent of the interior framing also having top and bottom sills, sieves arranged one above another in a plurality of vertical stacks or series interposed between and supported interiorly on the interior framing and exteriorly on the exterior framing, a floor and a ceiling inclosing at the bottom and at the top the space between the interior framing and the exterior framing, means consisting of substantially horizontal transverse rods adjustable in the exterior framing for adjusting vertically and supporting thereon the interior framing and sieves, and inclined upwardly-extending rods secured adjustably in the top sills and in the bottom sills respectively of the exterior framing adapted to secure the exterior framing in position against rocking laterally.

3. In a sieve-carrying frame of a sieve bolting-machine, an upper and a lower sill-frame, supporting-pillars adjustable endwise between the sill-frames, and means for binding the sill-frames to each other on the pillars.

4. In a sieve-carrying frame of a sieve bolting-machine, an upper and a lower sill-frame, hollow supporting-pillars between the sill-frames, hollow foot-pieces resting respectively against the upper and the lower sill-frames and on which the pillars telescope and are supported, means at one end of each pillar in connection with the foot-piece at that end adapted to adjust the pillar endwise on the foot-piece, and binding-rods through the sill-frames the pillars and the foot-pieces binding the parts together.

5. In a sieve bolting-machine comprising a sieve-frame of considerable height carrying numbers of sieves one above another in series and having a plurality of vertical pillars in the exterior framing, the combination with such frame and its pillars, of sieve suspending and adjusting means consisting of brackets secured to and adjustable vertically on the pillars, jointed suspending rods knuckle-jointed to the brackets, and rigid adjusting-rods secured to the brackets and to the sieve-frame below the brackets and adapted by rotation thereof to adjust the brackets up or down on the pillars thereby securing and leveling up or balancing of the sieve-frame on the rod-brackets and while the rods and their joints remain constantly in the same horizontal plane.

6. In a sieve bolting-machine having a sieve-carrying frame suspended to move freely laterally and a vertical revoluble shaft carrying an unbalanced load, means for rotating the shaft, comprising a pulley on the shaft two idle direction-changing pulleys mounted on the frame adjacent and at right angles to the pulley on the shaft, a driving-pulley, a tightening-pulley mounted on a block adjustable toward and from the driving-pulley, the driving and tightening pulleys being disposed respectively above and below the direction-

changing pulleys and in a plane substantially at a right angle to and above and below the plane of the shaft-pulley and the planes of the idle pulleys.

7. In a sieve bolting-machine having a sieve-carrying frame suspended to move freely laterally and a vertical revoluble shaft carrying an unbalanced load whereby by the rotation of the shaft the frame is given a gyratory movement, means independent of the means for giving the frame a gyratory movement for limiting the extent of the gyratory movement of the frame consisting of a pin secured to the frame and otherwise unconnected and projecting therefrom in the direction of the length of the shaft, and a stop secured to a non-movable support and having a circular opening considerably larger than the pin into which said pin projects and adapted by the limited play permitted to the pin therein to limit the gyratory movement of the frame to the extent of the opening in the stop.

8. In a sieve bolting-machine having a sieve-carrying frame suspended to move freely laterally and a vertical revoluble shaft carrying an unbalanced load whereby by the rotation of the shaft the frame is given a gyratory movement, means for limiting the extent of the gyratory movement of the frame, consisting of a head-piece secured to the frame at the end and across the axis of the shaft, the head-piece being provided with a transverse slot, a pin in the transverse slot and secured adjustably therein to the head-piece, and a stop secured to a non-movable support and having a circular opening into which said pin projects and adapted to limit the gyratory movement of the frame to the extent of the opening in the stop.

In testimony whereof we affix our signatures in presence of two witnesses.

JOHN FRASER.
ALLAN G. MATHER.

Witnesses:
C. T. BENEDICT,
ALMA KLUG.