

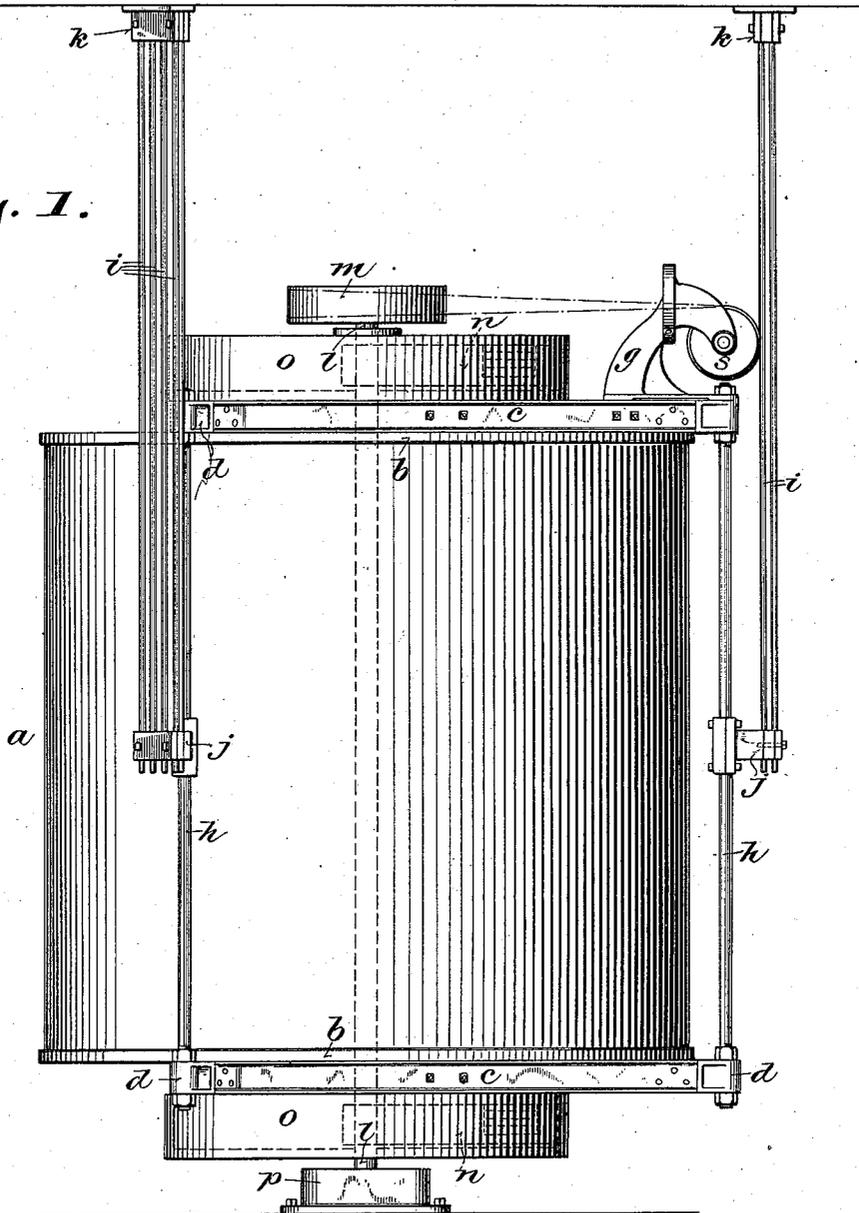
W. D. GRAY.
 GYRATORY BOLTING MACHINE.
 APPLICATION FILED JULY 14, 1905.

1,014,388.

Patented Jan. 9, 1912.

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses:
 Geo. W. Young,
 Chas. L. Gow.

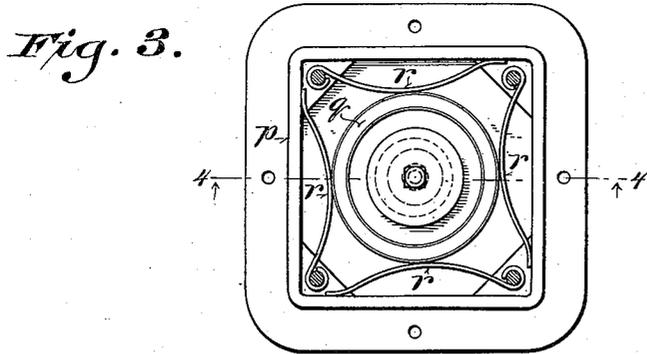
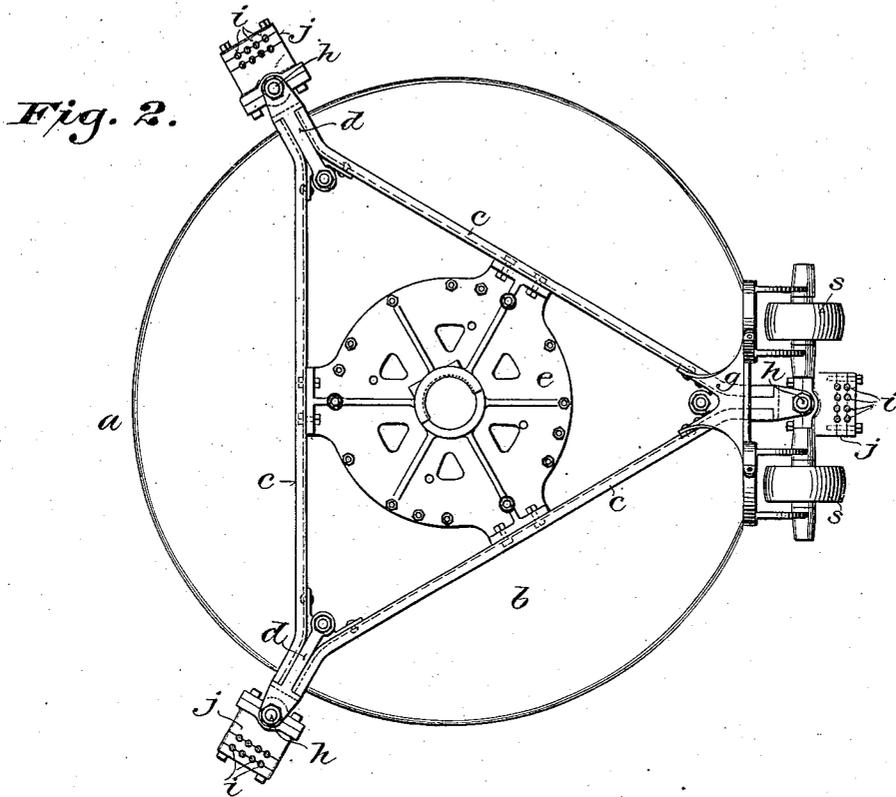
Inventor:
 William D. Gray,
 By *Wm. D. Gray*
 Roy W. Pender, Smith & Barrett
 Attorneys.

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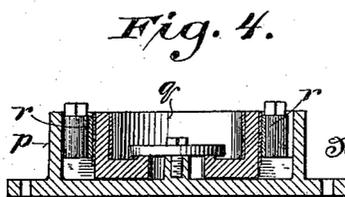
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2 SHEETS—SHEET 2.



Witnesses:
 Char. L. Ross,
 Geo. W. Young,



Inventor:
 William D. Gray.

By *Wm. H. Pender Smith & Co.*
 Attorneys.

UNITED STATES PATENT OFFICE.

WILLIAM D. GRAY, OF MILWAUKEE, WISCONSIN.

GYRATORY BOLTING-MACHINE.

1,014,388.

Specification of Letters Patent.

Patented Jan. 9, 1912.

Application filed July 14, 1905. Serial No. 269,578.

To all whom it may concern:

Be it known that I, WILLIAM D. GRAY, a citizen of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Gyratory Bolting-Machines, of which the following is a specification, reference being had to the accompanying drawing, forming a part thereof.

The main objects of this invention are to obtain an equal distribution of the weight of the machine on its supporting bearings, and an even smooth gyratory movement thereof; to prevent sagging of the sieves and the heads of the case and the consequent tendency of the stock to work toward the center of the machine, resulting in an uneven distribution of the stock over the sieves and imperfect operation of the machine; and generally to improve the construction and operation of machines of this class.

It consists in certain novel features of construction and in the peculiar arrangement of parts hereinafter particularly described and pointed out in the claims.

In the accompanying drawing like characters designate the same parts in the several figures.

Figure 1 is a side elevation of a bolting machine embodying the present invention; Fig. 2 is a plan view of the same; Fig. 3 is a plan view on an enlarged scale of the yielding guide for confining the gyrating shaft approximately to its proper orbit; and Fig. 4 is a vertical section of said guide on the line 4 4, Fig. 3.

Referring to Figs. 1 and 2, *a* designates the sieve case which is preferably of cylindrical or approximately cylindrical form and is closed at its upper and lower ends by circular or approximately circular heads *b*. To the outer sides of the heads *b* are attached equilateral stiffening frames *c*, which are preferably constructed of channel bars riveted or bolted at the ends to castings *d* and at the middle to a castiron plate *e*, which is centrally formed or provided with a box *f*. The bars *c* of the stiffening frame at the upper end of the machine, or at that end from which it is driven, are bolted or riveted at one corner of the frame, as shown in Fig. 2, to a castiron pulley support *g*, which takes the place of the castings *d* at the

other two corners of the frame. With the exception of this pulley support the stiffening frames at both ends of the machine are alike. The castings *d* and *e* are bolted to the heads *b*, and the outer ends of the castings *d* which project beyond the heads are formed with vertical sleeves in which vertical parallel tie rods *h* are adjustably secured by nuts threaded on said rods. These tie rods rigidly connect the two stiffening frames outside of and at equidistant points around the case *a*. The case is suspended or supported by three vibratory hangers or supporting members *i*, connected at one end with the tie rods *h* about midway between the heads of the case, and at the other end with the ceiling or other stationary support above or below the machine. In the present case hangers are shown for this purpose, each hanger being composed of a number of bamboo or other flexible rods, which are secured at their ends to the tie rods *h* and to the ceiling or other stationary support by clamps *j* and *k*. In place however, of these flexible hangers or supporting rods, other forms of hangers or vibratory supports of the usual or any suitable construction may be employed, provided however that they have the characteristic of being longitudinally rigid and universally flexible in a lateral direction similarly to the bamboo or flexible rods *i*.

Gyratory bolting machines of this class when suspended or supported by four hangers or vibratory supporting members arranged at equal distances from each other around the machine, are unsatisfactory because of the difficulty if not impossibility of adjusting the hangers or supporting members so that the weight of the machine and its load will be equally distributed upon them. With three hangers or supporting members connected and arranged as shown in the drawing and above described, at substantially equal distances from each other around the machine, the weight is equally distributed to and through all the hangers or supports, and a more smooth and even gyratory movement of the machine is secured than is possible with four hangers or supports.

In machines of this kind which are suspended or supported around the periphery, the heads of the sieve cases being left un-

supported or without reinforcement, are apt to sag at the center and thus cause the sieves to sag in like manner. This tends to carry the stock toward the center of the machine and to interfere with its proper and most efficient operation. With the stiffening frames applied to the heads of the case and rigidly connected by tie rods as hereinbefore described, this tendency of the heads of the case and of the sieves to sag, thereby throwing the stock toward the center of the machine, is avoided. And by combining with the supporting frame, applied as just described, supporting means consisting of three vibratory supporting members connected with the tie rods at approximately equal distances around the machine, each supporting member being longitudinally rigid and universally flexible in a lateral direction, the axis of the sieve-case is held constantly perpendicular to a horizontal plane while at the same time permitting a free gyratory movement. The possibility of the heads sagging is thus prevented and a gyrating motion is obtained and transmission of jarring or vibration to the floor or ceiling from which the structure is suspended is prevented. The several features specified each modify the action of the others so that it is made possible to obtain constantly even distribution of the material over the sieves and a gyrating movement in which the axis of the sieve-case is maintained constantly perpendicular to a horizontal plane and transmission of vibration to the floor or ceiling practically prevented as before stated.

A gyratory movement may be imparted to the sieve case by any of the means usually employed in this class of machines. As suitable for the purpose an eccentrically weighted shaft l is shown. This shaft is supported centrally in the case a by the boxes f , and is provided at its upper end with a pulley m . Adjacent to the ends of the case it is also provided with adjustable weights n , which are incased and protected by boxes o , as shown in Fig. 1.

In starting and stopping the machine, one end of the shaft l , which extends through the weight box o , is confined approximately to its proper orbit by a guide consisting of a box or support p bolted to the floor or foundation of the mill, a ring q movably mounted on said box or support, and interposed springs r holding said ring normally in its central position, as shown in Figs. 3 and 4. The ring q is faced inside and outside with leather or other cushioning material, to deaden the shock and noise which might otherwise be produced by contact between said ring, the shaft l and the springs r , when the machine is not running at its normal speed. These springs, which are pivoted at one end to studs rising

from the base of the box or support p , and bear freely at the other end against the inner wall of said box or support, are bowed inwardly between their ends against the ring q and normally hold it in its central position co-axial with the shaft l when the machine is at rest. The shaft l is turned and the sieve case caused to gyrate by a belt passing around a suitably located driving pulley (not shown), over idlers s adjustably mounted in the supporting castings g and around the pulley m , which partakes of the gyratory movement imparted through it to case a . When the machine attains and runs at its critical speed, the end of the shaft l opposite its driving connection describes a path within the cushioned guide ring q and does not come in contact therewith, the function of the guide being merely to confine the machine approximately to the orbit of its normal gyrating movement and prevent its running wild until it attains its normal speed in starting and comes to rest in stopping.

Various changes in the details of construction and arrangement of parts may be made without departing from the principle and intended scope of the invention.

I claim:

1. A gyratory bolting machine, comprising a sieve case, a frame for bracing the sieve-case and preventing sagging of its heads, consisting of members extending across the top and bottom heads from side to side thereof and tie rods disposed at substantially equal distances around the sieve-case and connecting said top and bottom members together, and a support for the sieve-case and its frame consisting of three vibratory supporting members connected with the tie rods at approximately equal distances around the machine, each of said supporting members being longitudinally rigid and universally flexible in a lateral direction so as to hold the axis of the sieve case constantly perpendicular to a horizontal plane and at the same time permit a free gyratory movement, substantially as described.

2. In a gyratory bolting machine the combination with the sieve case having upper and lower closing heads, of equilateral triangular stiffening frames applied to the heads of the case and connected with each other at their equidistant angles by tie rods and vibratory supporting members connected with said rods, substantially as described.

3. In a gyratory bolting machine the combination with the sieve case and vibratory supporting members connected therewith, of an eccentrically weighted shaft journaled in the heads of said case, means for turning said shaft, a stationary guide and spring support, a guiding ring movably mounted

on said support around one end of said shaft and within which the shaft has a movement to and from the walls of the ring, and springs interposed between said support and ring and normally holding the latter in its central position, substantially as described.

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

WILLIAM D. GRAY.

Witnesses:

CHAS. L. GOSS,
BERNARD C. ROLOFF.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."