

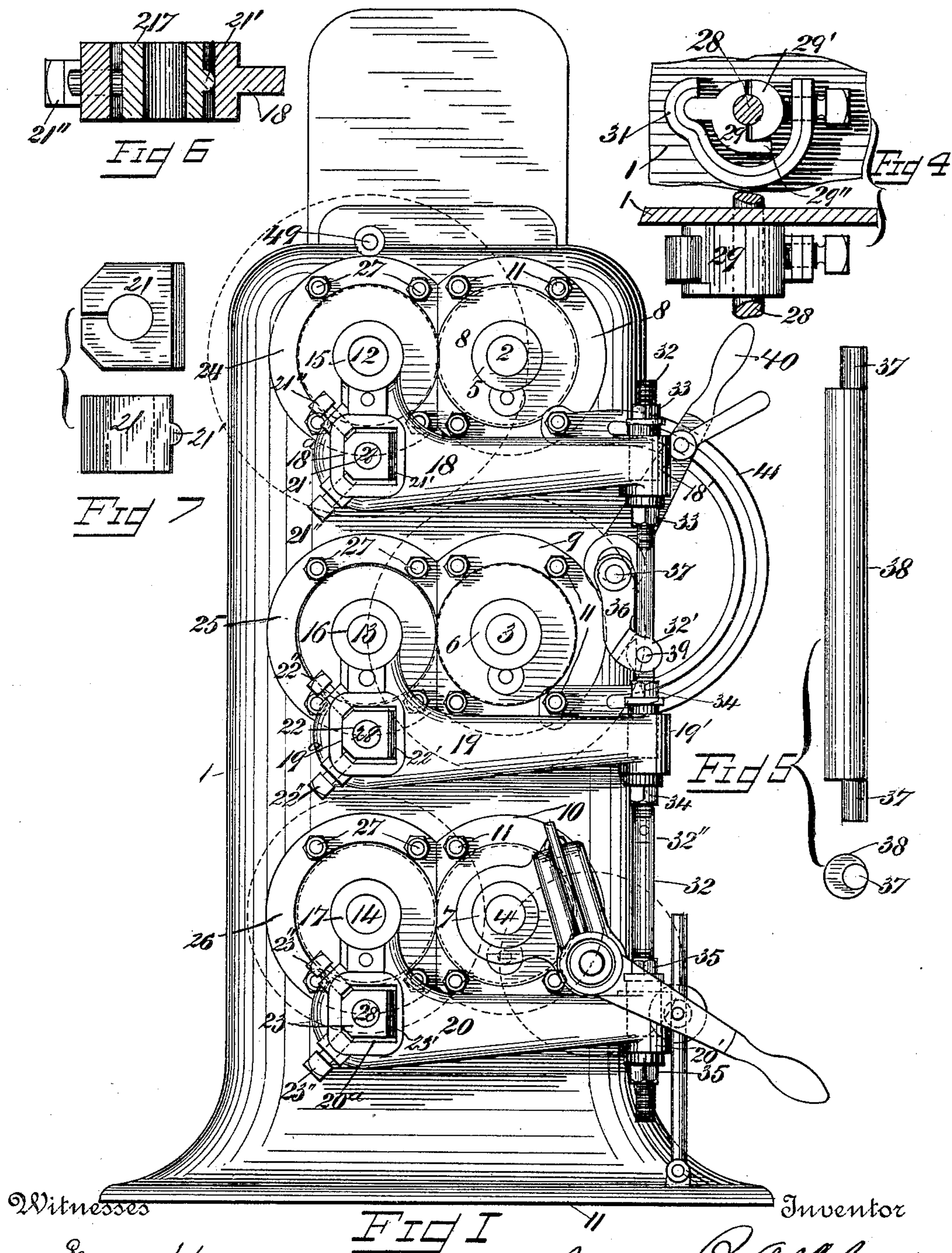
(No Model.)

8 Sheets—Sheet 1.

J. B. ALLFREE.
ROLLER GRINDING MILL.

No. 467,713.

Patented Jan. 26, 1892.



Witnesses

Emos Hege
E. R. Wapenham

FIG I

Inventor

James B. Allfree
By *Thompson & Bell* Attorney

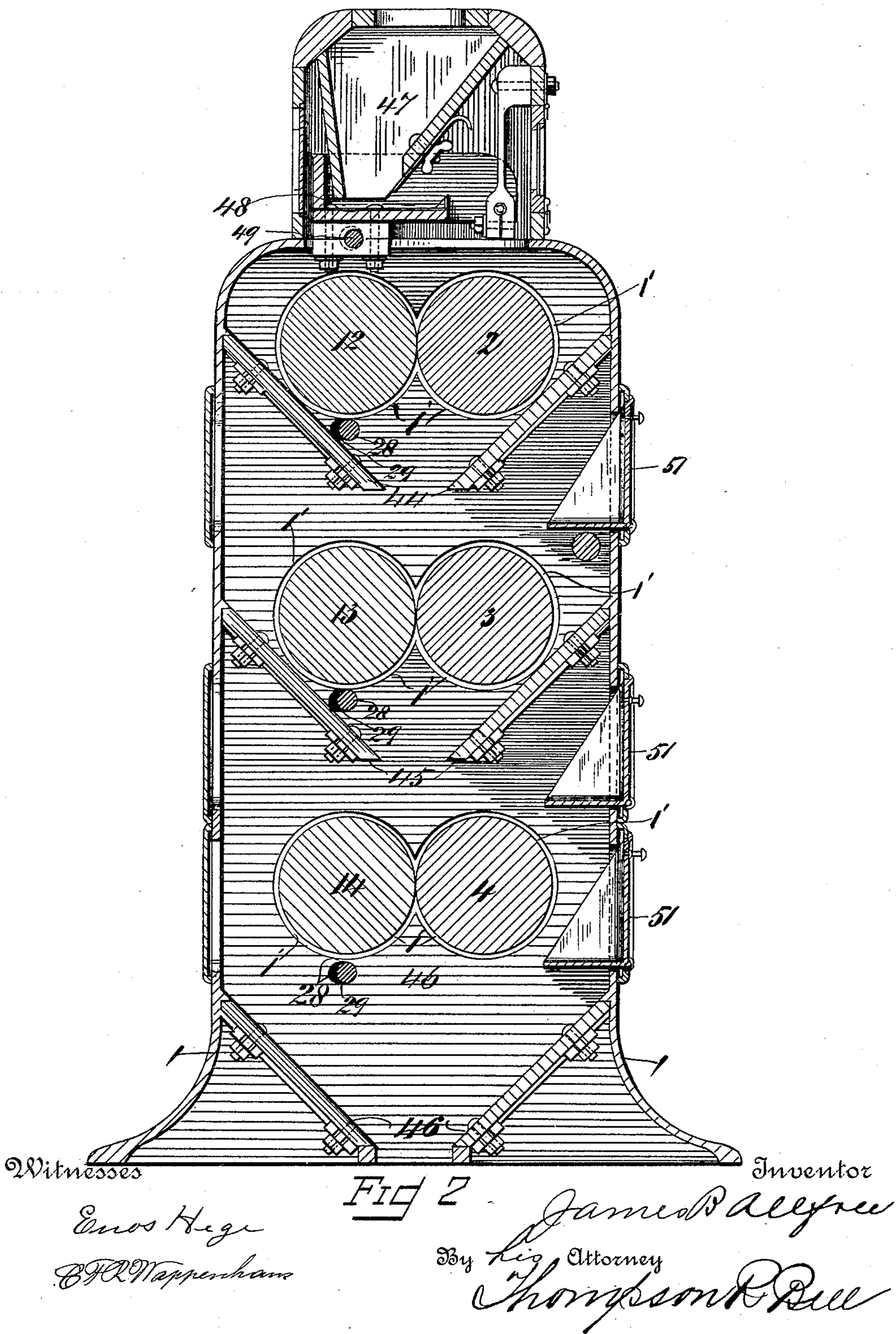
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3 Sheets—Sheet 2.

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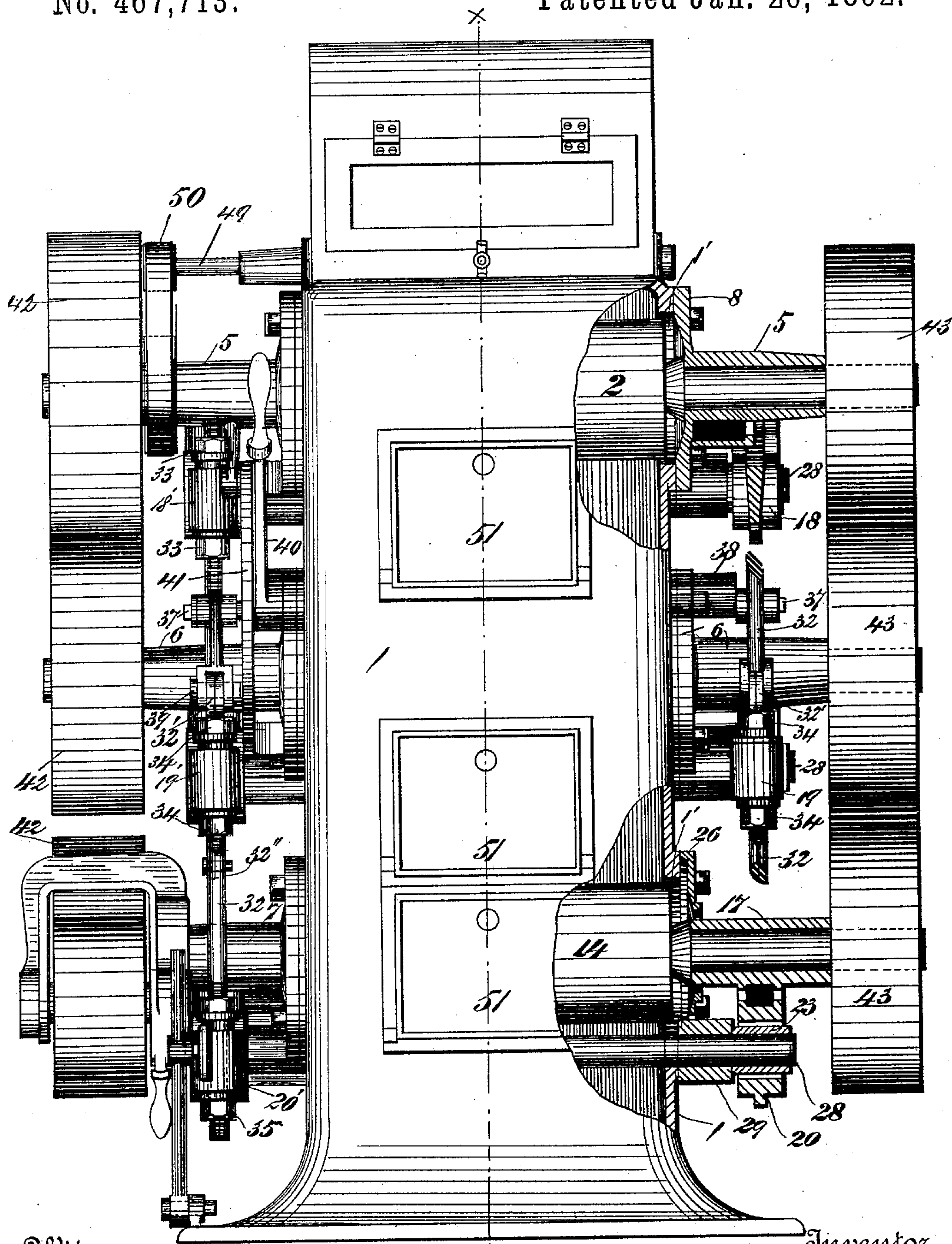
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Witnesses


Eros Hege
CPR Maranhão

Fig 5

Inventor



 By his Attorney



UNITED STATES PATENT OFFICE.

JAMES B. ALLFREE, OF INDIANAPOLIS, INDIANA.

ROLLER GRINDING-MILL.

SPECIFICATION forming part of Letters Patent No. 467,713, dated January 26, 1892.

Application filed April 24, 1891. Serial No. 390,319. (No model.)

To all whom it may concern:

Be it known that I, JAMES B. ALLFREE, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented new and useful Improvements in Roller Grinding-Mills, of which the following is a specification.

My invention relates to certain improvements in roller grinding-mills in which corrugated chilled cast-iron rolls are used for reducing cereals, particularly corn, to meal or a finely-divided state; and it consists in devices and an arrangement of parts hereinafter set forth.

The object of my invention is to provide means whereby the rolls may be accurately and readily adjusted in either a vertical or a horizontal direction; also, to provide means whereby the rolls may be independently and rapidly caused to recede or to approach each other to regulate the degree of fineness of the ground material; also, to provide an improved means whereby all the series of rolls may be instantly and simultaneously separated or thrown out when not in use; also, to especially provide means whereby all tendency to vibration will be avoided; also, to provide means whereby any of the rolls may be quickly removed from the machine or replaced therein without detaching the several parts thereof, and also to provide a cheap, durable, and compact machine having a series of three or more pairs of rolls inclosed and arranged therein to produce three reductions of the material. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of my machine. Fig. 2 is a transverse sectional elevation through the line X X, Fig. 3, showing the rolls and feed mechanism. Fig. 3 is a front elevation showing the roll-journals and their bearings partly in section. Fig. 4 is a detail view of the elastic or flexible fulcrum of the journal-bearing arms or levers. Fig. 5 is a detail view of the roller-disengaging or throw-out shaft. Fig. 6 is a detail sectional view of the adjustable fulcrum of the lever-arm of the journal-bearing, and Fig. 7 is a detail view of the adjustable fulcrum-block.

Similar numbers of reference designate like parts throughout the several views.

1 designates the main frame or casing for supporting the various parts of the mechanism and provided with the end circular openings 1', formed therein and concentric with the axis of the grinding-rolls.

2, 3, and 4 designate the fixed rolls arranged preferably in a vertical line and journaled in the bearings 5, 6, and 7, having the disk-formed covers 8, 9, and 10 formed on the inner ends thereof and integral therewith, and fitted and removably secured to the frame 1 by the securing-bolts 11, or other suitable securing device.

12, 13, and 14 designate the removable rolls arranged parallel with their opposite rolls 2, 3, and 4 and journaled in the bearings 15, 16, and 17, formed on the shorter arm of the adjusting-levers 18, 19, and 20. At the fulcrum of the latter levers are formed the eyes or oblong slots or openings 18^a 19^a 20^a, adapted to receive the adjustable fulcrum-spring or clamp-blocks 21, 22, and 23, said blocks provided with the bearing ribs or webs 21', 22', and 23', formed thereon and integral therewith, having their sides split, as shown in Fig. 7, and may be adjusted independently upwardly and downwardly therein and secured, set, and clamped on their fulcrum-rods by the set-screws 21'', 22'', and 23'', as hereinafter set forth.

24, 25, and 26 designate the end covers of the movable roller-openings removably secured to the frame 1 by the bolts 27. The fulcrum-shafts 28, on the ends of which the levers 18, 19, and 20 swing, are loosely fitted in their half-boxes 29, formed on the frame 1 integral therewith and provided with the sliding half-boxes 29', loosely fitting in the guide-ways 29'' and clamped and secured thereto by the spring-clamps 31, or any other suitable device, whereby the said fulcrum-shaft may be permitted to spring outwardly and thus permit the rolls to separate or recede from the fixed rolls when any foreign or unyielding substance is passed between them.

32 designates the tie-rods of the levers for supporting the rolls passing through the sockets 18', 19', and 20', formed on the ends or extremities of the larger arms thereof and adjustably secured thereto by the adjusting-screw-nuts 33, 34, and 35, screwed on the threaded portions of said tie-rods for the pur-

pose of setting and adjusting the levers 18, 19, and 20, to adjust the movable rolls 12, 13, and 14 to any required position relative to their adjacent and fixed rolls. The tie-rods 32 are held in position by the suspension links 36, said links being drilled at their top ends to receive the eccentric or crank ends 37 of the throw-out or disengaging shaft 38, and have their bottom ends forked to receive the knuckle-joints 32' of said tie-rods, and drilled to receive the joint-pins 39, whereby they are connected. On the tie-rods 32 are also formed the knuckle-joints 32'', which I provide for the purpose of permitting the removal or detachment of any of the levers 18, 19, and 20 without disconnecting the entire tie-rod from all the levers.

The disengaging or throw-out shaft 38 is journaled in any suitable bearings formed in the frame 1 and provided with the operating handle or lever 40, whereto is secured any suitable locking-screw adapted to clamp the segment 41 for the purpose of retaining said levers in position. (See Fig. 1.)

42 designates the driving-pulleys of the fast rolls, and 43 designates those of the differential or slower-revolving rolls.

44, 45, and 46 designate the inclined shelves or chutes which I provide for the purpose of conducting the material to the successive rolls in its passage through the machine, said shelves removably secured to the frame 1 by suitable securing-bolts. (Shown in Fig. 2.)

On the top of the frame is secured any suitable feed device; but for this class of machine I prefer to use the chute 47 for conveying the material to the hopper 48, said hopper vibrated by the crank-shaft 49, driven by the belt-pulley 50, (see Fig. 3,) to insure a regular and equal distribution of the material over the rolls.

It is obvious that any one of the rolls can be independently adjusted either upwardly or downwardly by means of the adjusting-screws 21'', 22'', and 23'' to move said levers upwardly or downwardly on their fulcrum or tram blocks 21, 22, and 23, and may also be moved in a horizontal direction by the adjusting-nuts 33, 34, and 35 of the tie-rods 32 to raise or lower the ends of the levers 18, 19, and 20, thus independently moving either of the end journals 15, 16, and 17 to perfectly align the rolls.

When it is desired to remove or replace any of the rolls for repair, one of the end covers and the attachments on one end of the roller to be removed are detached and the rolls or roll is or are withdrawn endwise through the concentric openings formed in the frame 1. The rolls are simultaneously disengaged or thrown out from their working position by moving the disengaging-lever 40 in a downward direction, thus raising or elevating the outer ends of the longer arms of the levers 18, 19, and 20 to move the rolls outwardly or to cause them to recede from their opposite and fixed rolls.

I prefer to construct the tram-blocks 21, 22, and 23 with the longitudinal slits, hereinbefore described, for the purpose of permitting the said blocks to be sprung by the set-screws 21'', 22'', and 23'' to take up the lost motion and avoiding vibration resulting from the stress due to grinding the materials between the rolls.

I provide the opening and the doors 51 for the purpose of easy access to the rolls when it is required to remove them, and also for the purpose of examining the material while passing through the various stages of reduction.

Having thus fully described the construction and operation of my invention, what I claim as new and useful, and desire to cover by Letters Patent of the United States therefor, is—

1. In a roller grinding-mill, the combination, with a fixed roller, of a movable roller, a swinging lever in which said roll is journaled, a yielding movable fulcrum-rod on the ends of which said levers are mounted and independently adjusted, and suitable means for retaining said levers in any desired position, substantially as set forth.

2. In a roller grinding-mill, the combination, with a fixed roller and adjustable swinging levers in which said roller is mounted, of a movable roller and a yielding movable fulcrum-rod, on the ends of which said levers are mounted and adjusted independently, substantially as set forth.

3. In a roller grinding-mill, the combination, with a fixed roller, of a movable roller mounted at its ends on adjustable levers, yielding movable fulcrum-rods on the ends of which said levers are mounted, and suitable sustaining-rods whereby said levers are held in position and said rolls are independently adjusted and simultaneously disengaged when not in use, substantially as set forth.

4. In a roller grinding-mill, the combination, with a roll-carrying arm and its fulcrum-rod passing through said mill-frame parallel with the axis of said rolls, of a flexible bearing on which the roll-carrying arm is adjustably pivoted and held in position, substantially as set forth.

5. In a roller grinding-mill, the combination, with a roller-carrying arm having an oblong opening formed therein and under the journal thereof, of a tram-box having one of its sides split, said box adjustably secured in said opening, a fulcrum-rod fitted in suitable bearings formed in said mill-frame and on which said tram-box is journaled, and means for compressing said tram-box on said fulcrum-rod, whereby said arm may be raised or lowered relatively to said tram-box and firmly secured in any position, substantially as set forth.

6. In a roller grinding-mill, the combination, with a roller-carrying arm, of a tram-box having one of its sides split, said box journaled on a suitable fulcrum-rod and fitted in a suitable bearing formed in said mill-

frame, and suitable adjustable or tramming screws screwed in said rolls carrying arms and arranged to compress said tram-block on said fulcrum-rod, substantially as described.

5 7. In a roller grinding-mill, the combination of a series of roller-carrying arms vertically arranged and adjustably fixed to suitable tie-rods, said rods connected and operated by suitable connecting-links, as 36, with
10 an eccentric-shaft, its operating-lever, sector, and binding-screw for maintaining said levers and eccentric-shafts in position, all arranged to co-operate substantially as set forth.

8. In a roller grinding-mill, the combina-

tion of the frame thereof having oblong open- 15
ings formed therein through which the fulcrum-rods pass, the fulcrum-shafts, their adjustable and removable clamp-bearings, and suitable adjustable clamping-springs, as 31, all substantially as and for the purpose set 20
forth.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

JAMES B. ALLFREE.

Witnesses:

WILLIAM H. RUEF,
THOMPSON R. BELL.