(No Model.)

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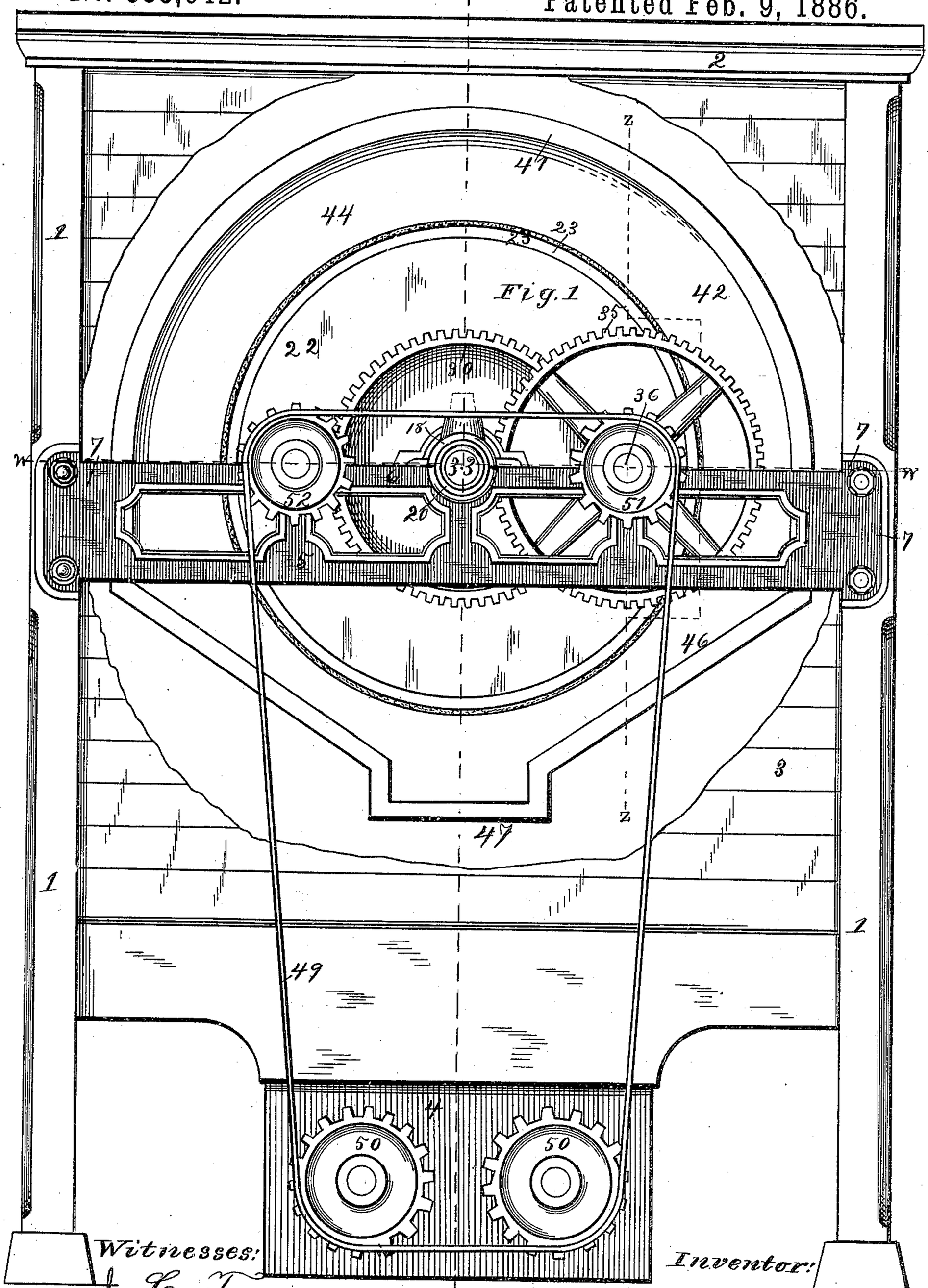
G. T. SMITH.

FLOUR BOLT.

No. 335,642. Patented Feb. 9, 1886.



Witnesses:
F. C. Turner
B. W. Sommers

Inventor:
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(No Model.)

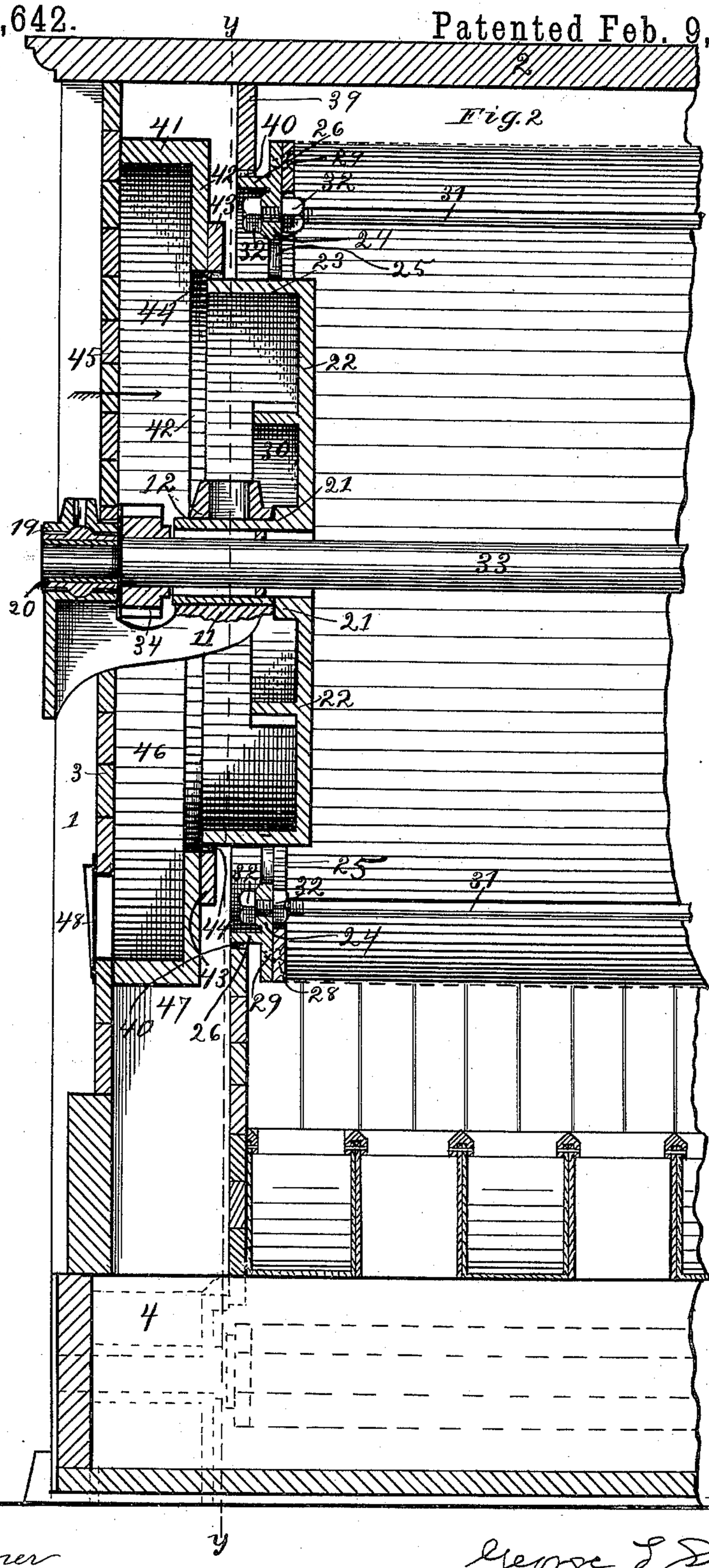
5 Sheets—Sheet 2.

G. T. SMITH.

FLOUR BOLT.

No. 335,642. Patented Feb. 9, 1886.

Fig. 2



Witnesses:

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5 Sheets—Sheet 3.

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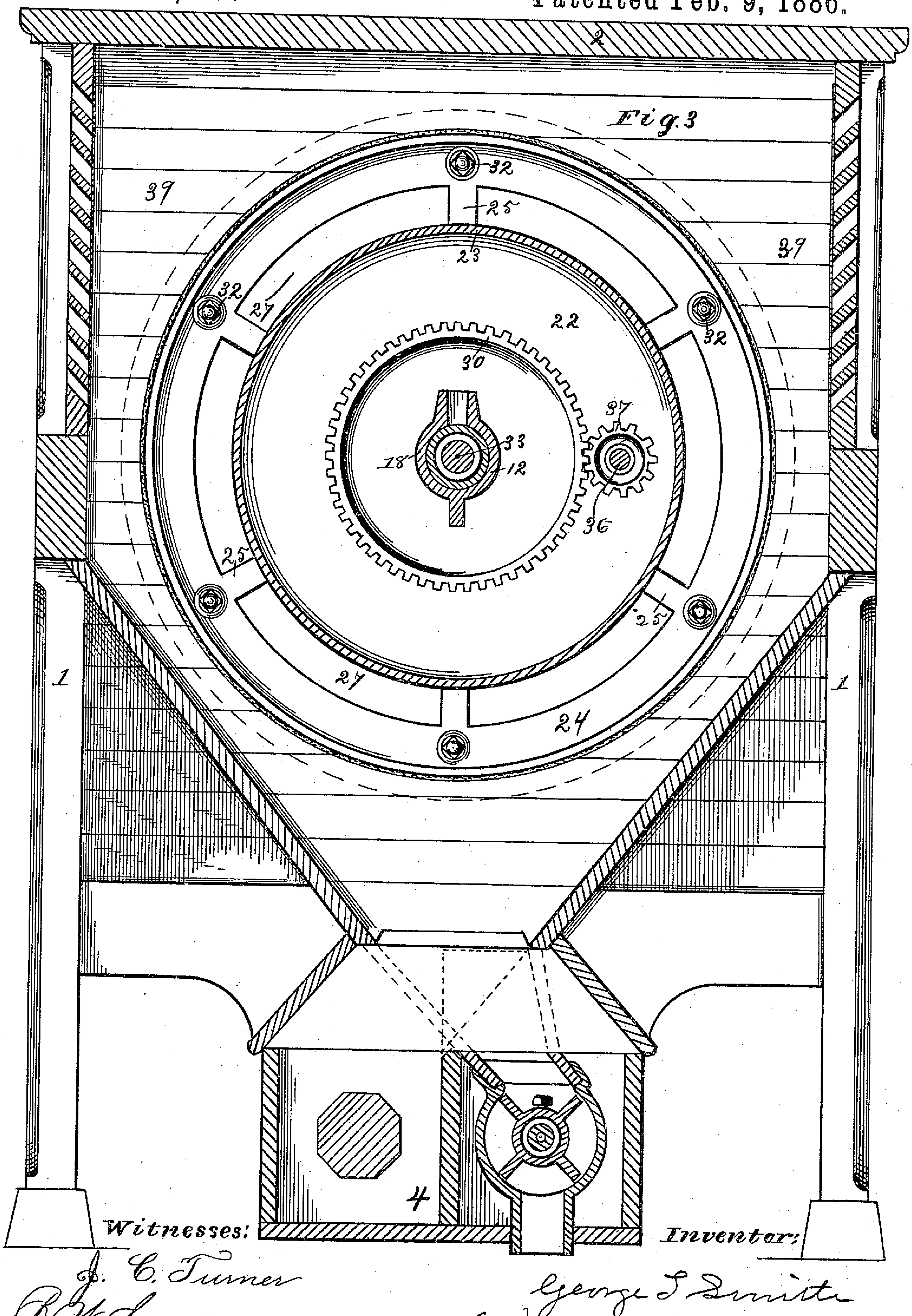

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(No Model.)

5 Sheets—Sheet 4.

G. T. SMITH.

FLOUR BOLT.

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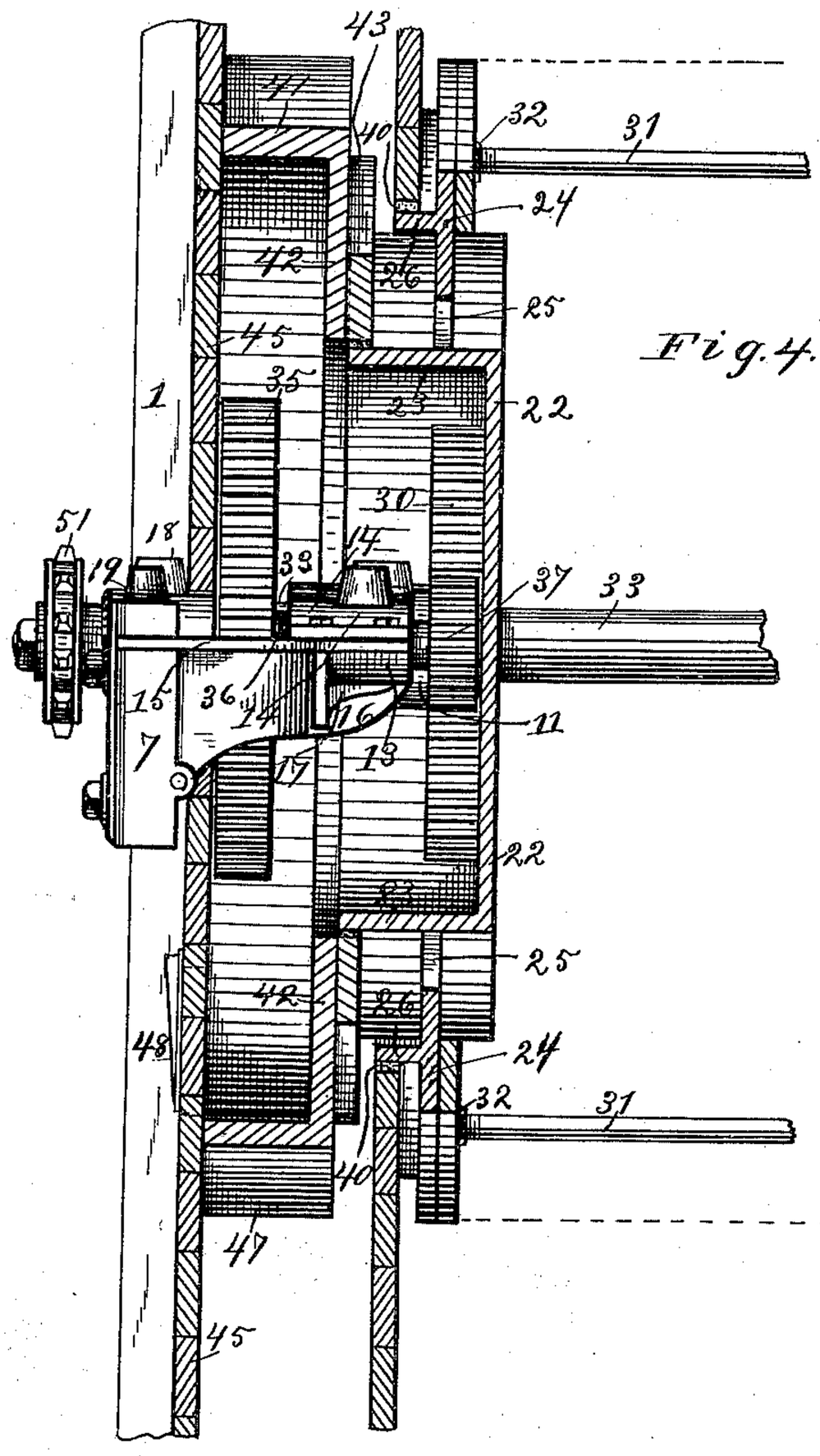

Fig. 4.

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(No Model.)

5 Sheets—Sheet 5.

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FLOUR BOLT.

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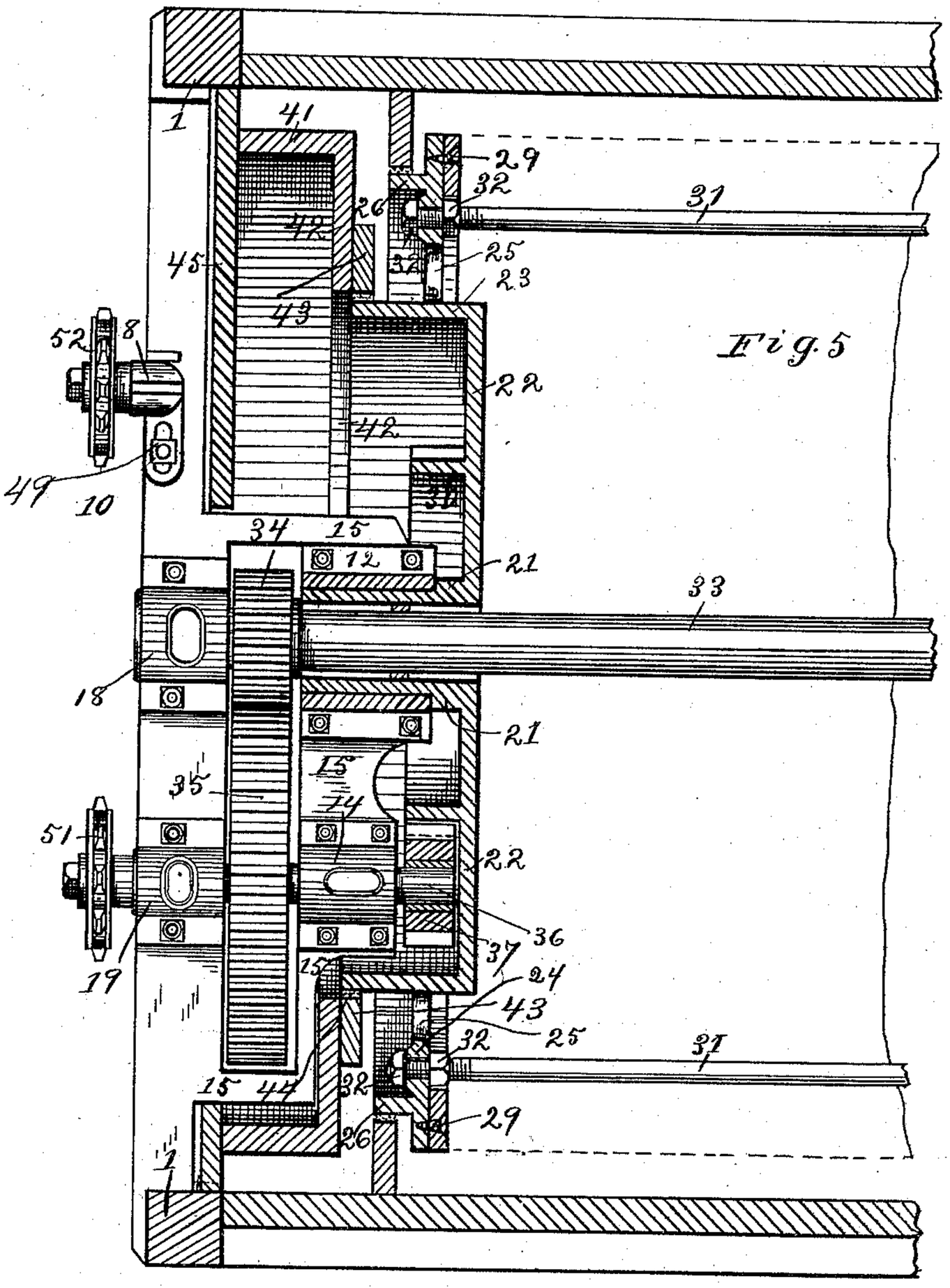

Fig. 5

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UNITED STATES PATENT OFFICE.

GEORGE T. SMITH, OF JACKSON, MICHIGAN.

FLOUR-BOLT.

SPECIFICATION forming part of Letters Patent No. 335,642, dated February 9, 1886.

Application filed June 1, 1885. Serial No. 167,273. (No model.)

To all whom it may concern:

Be it known that I, GEORGE T. SMITH, a citizen of the United States, residing at Jackson, 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, reference being had therein to the accompanying drawings.

Figure 1 is an end elevation of my improved flour-bolt, part of the casing being broken away. Fig. 2 is a vertical longitudinal section on line *x x*, Fig. 1. Fig. 3 is a transverse section on line *y y*, Fig. 2. Fig. 4 is a partial vertical section on line *z z*, Fig. 1. Fig. 5 is a horizontal section of the reel-head shown in Figs. 1 and 3 on the line *w w*, Fig. 1.

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

1 are the posts; 2, the upper girt of the frame; 3, the casing of the tail end or discharging end of the bolt; and 4 is the box or trough of a double conveyer, in which the worms are arranged side by side.

Referring particularly to Figs. 1 and 5, 5 6 7 is an iron or other metal bridge-tree bolted firmly in a horizontal position to the posts 1 1. 8 is a bearing-plate, having a laterally-extended shank or arm, which is slotted to receive a tightening-bolt or set-screw, 10, which adjustably secures to the upper edge or rib, 6, of the bridge-tree. 11 12 are respectively the lower and upper part of a boxing adapted to receive the hollow trunnion of the reel-head, to be hereinafter described. 13 14 are respectively the lower and upper part of a boxing or bearing to receive a short shaft. 15 15 is a web connecting the bearings 11 12 13 14 with the bridge-tree, and 16 17 are supporting brackets or braces projecting inwardly and upwardly from the inner face of the bridge-tree to further support the bearings. The lower parts, 11 and 13, of the boxing, the web 15, the brackets 16 17, and the bridge-tree are all cast in a single piece of metal. 18 19 are respectively the removable upper portions or caps of bearings for a beater-shaft and short shaft, the lower parts of these boxings being cast also integral with the bridge-tree. Of course these several bearings should be babbitted. 20 is a sleeve-bearing having a central spherical enlargement, which latter is seated in a corresponding-shaped cavity, in the bearing of which 18 is the cap. 21 is the trunnion of the reel-head at the tail end of the bolt. This trunnion projects at a right angle from a circular plate or disk, 22, which has at its outer edge a rearwardly-projecting casing-flange, 23. 24 24 is a peripheral ring or flange concentric to the flange 23 and at right angles thereto, it being connected with said flange 23 by means of short radial arms or spokes 25. 26 is a flour-guard projecting rearwardly from the peripheral flange 24 at a short distance from its outer edge, to prevent flour from escaping with the tailings, and there are a series of open spaces, 27 27, between the flanges 23 24, for the passage of tailings. 28 is a wooden rim or flange secured to the inner face of peripheral flange 24 by means of wood screws 29 29, or other equivalent devices. The outer edge of the wooden rim 28 is of about the same diameter as that of the peripheral flange 24, and forms a support for the bolt-cloth at that end of the reel. 30 is an externally-toothed rim cast by preference upon the rear face of the plate or circular disk 22 and concentric to the hollow trunnion 21. 31 31 are stay-bolts connecting the tail-end reel-head, which I have just described, to a suitably-constructed reel-head or its equivalent at the opposite end of the reel. 32 32 are nuts applied to the screw-threaded ends of the stay-bolts, to properly secure and adjust the reel-head, and, when preferred, the flange 24 may be re-enforced where the stay-bolts pass through by suitable ribs, beads, or otherwise, as indicated in Figs. 2 and 5. 33 is the beater-shaft, passing centrally through the reel and through the hollow trunnion 21, and into or through the tubular bearing 20. This beater-shaft may be shouldered where it enters the sleeve-bearing 20, so as to resist rearward longitudinal thrust, a longitudinal thrust in the opposite direction being provided against by a collar or similar contrivance at the opposite end of the reel, as is customary in machines of this class. 34 is a pinion attached to the beater-shaft and meshing with a spur-gear, 35, mounted upon a short shaft, 36, supported in the bearings 13 14 and 18 19, which have been described. 37 is a pinion mounted upon the inner end of the short shaft 36, and meshing with

the externally-toothed rim 30, so that, power being applied to the beater-shaft, the reel and its attached bolting-cloth 38 is driven in the same direction with the beater-shaft and beaters, but at a much slower speed. 39 is a vertical partition arranged a short distance inside of the tail-end casing 3, and having a circular opening concentric to the beater-shaft and of little greater diameter than the flour-guard 26, which projects outward through this circular opening. 40 is a packing of sheep-skin, with the wool toward the flange, interposed between the flange 26 and the adjacent edge of the circular opening, to prevent the passage of flour or other material. Attached to the inner face of the tail-end casing there is a shell or drum, which may be made angular in form, having a top, 41, a vertical wall, 42, sides, and a bottom. The circular opening in the wall 42 is of a little greater diameter than the casing-flange 23 of the reel-head; and 43 is a rim or ring attached to the inner face of the vertical wall 42, and surrounding the flange 23 of the reel-head, there being at this point, preferably, a sheep-skin packing 44. (See Figs. 2 and 5.) As indicated in Fig. 1, the lower portions of the side walls, 45 45, of the shell are inclined inward toward each other, as at 46 46, to the bottom 47, which is quite short, there being a hand-hole, covered by a valve, 48, at this point, to afford access to this hopper-bottomed shell; but the shell may be circular in form, with its outer wall or rim consisting of a hoop of wood or metal, as shall be preferred, in which case the valve 48 may be at the lowest point of the hoop.

Referring to Fig. 1, 49 is a belt, preferably of chain, connecting the pulleys or sprocket-wheels 50 50 with a sprocket-wheel, 51, on the outer end of the short shaft 36, and a tightener, 52, which is mounted upon a stub axle projecting from the adjustable bearing-plate 8, so that the tension of this belt 49 can be regulated at will. The sprocket-wheels 50 50 are mounted upon the projecting end or gudgeons of the conveyer-shafts.

I have not shown the construction of the head or receiving end of the reel, nor of the mechanism for feeding material through the reel, nor of the conveyers, because these last-referred-to parts may be of any usual or approved construction which may be adapted for use in connection with those parts of the reel to which my invention pertains, and which are shown and described with such clearness as will enable those who are familiar with similar machines to construct the same.

In working this invention the tailings will pass out through the openings 27, (see Figs. 2, 3, and 5,) and thence through the chamber 53, formed between the tail-end casing and the vertical partition 39, and thence out of the machine through the spout usually employed at the lower end of the chamber, or through a discharging-valve arranged to permit the passage of the tailings without allowing the entrance or exit of air-currents.

From an examination of the drawings and the above description it will be readily understood that the parts 22 23 and 41 to 47, inclusive, constitute a housing or shell to prevent tailings from contact with the bearings and driving-gear; and it will also be understood that such oil as may drip from the bearings, together with any other dirt that may result from the action of the gearing, will fall to the bottom of this housing or casing near the hand-hole and valve 48, whence it will either escape from the machine or can be readily removed by the operator.

By an examination of Figs. 4 and 5 it will be seen that endwise movement of the short shaft 36 is prevented by reason of the hub of the sprocket-wheel 51 engaging with the outer face of the bearing 19 and the hub of spur-gear 35 engaging with the inner face or end of the same bearing; and it will also be understood that the employment of the cast-iron bridge-tree, with its attached bearings, furnishes not only bearings for both ends of the short shaft 36 and for the trunnion and rear end of the beater-shaft of such rigid character as to insure a permanent alignment and relation of these bearings to each other, but also permits a very compact arrangement of the driving-gear, whereby ease of operation and durability of gearing is attained.

It is apparent that the casing-flange 23, forming part of the reel-head, might be extended such distance toward the tail-end casing 3 as to cover the pinion and gear 34 35, the rear edge of said flange being made to fit so closely the tail-end casing as to prevent the passage of material at that point; but the construction shown possesses some advantages over the one just indicated. For instance, the one which I have adopted provides a stationary receptacle or pocket near the valve 48 to receive and retain the oil-drippings and other dirt, whence it can be conveniently removed from the hand-hole. Again, the weight of the metal required for the reel-head is much less. Again, this construction of the casing or housing for the gears, being made in two parts, enables me to make the flange 23 of comparatively small diameter, so as to insure a suitable size for the openings 27 and for the peripheral flange 24, while at the same time the part of the casing or shell which is attached to the tail-end casing 3 may be made of any desired size, so as to afford convenient access to the gearing and the bearings.

I do not in this case claim any inventions except those which are specifically recited in the claims hereof, reserving the right to claim all patentable features shown or described in other applications, Nos. 114,990, 133,195, 154,911, and 173,462, filed, respectively, December 18, 1883, May 29, 1884, February 4, 1885, and August 3, 1885.

What I claim is—

1. In a flour-bolt, the combination of the beater-shaft, a bearing for the outer end of the beater-shaft, the reel-head provided with

a trunnion surrounding the beater-shaft, the driving-gears connecting the beater-shaft with the trunnion and arranged between the beater-shaft bearing and the reel-head, and a casing surrounding the gearing to prevent the tailings from entering the gearing, substantially as set forth.

2. In a flour-bolt, the combination of the beater-shaft, a bearing for the outer end of the beater-shaft, the reel-head provided with a trunnion surrounding the beater-shaft, gearing arranged between the beater-shaft bearing and the reel-head, and the casing below the gearing, adapted to receive the oil dropping from the bearings and prevent said oil from mingling with the tailings, substantially as set forth.

3. In a flour-bolt, the combination of the beater-shaft, the reel-head provided with a trunnion surrounding the beater-shaft, gearing connecting the beater-shaft with the reel-head, and a shell surrounding the gearing and made in two parts, of which one part is attached to the casing, and the other part is attached to and revolves with the reel-head, substantially as set forth.

4. In a flour-bolt, the combination of the beater-shaft, the reel-head provided with a trunnion surrounding the beater-shaft, gears connecting the beater-shaft and the reel-head, and a casing surrounding the gearing and made in two parts, of which one part is attached to the casing, and the other part is of less diameter and attached to and revolves with the reel-head, substantially as set forth.

5. In a flour-bolt, the combination of the beater-shaft, the reel-head provided with a trunnion surrounding the beater-shaft, gearing connecting the beater-shaft with the reel-head, the casing at the tail end of the bolt, a partition arranged parallel with said casing and a short distance inside thereof, a flange projecting rearward from the reel-head and fitting closely a circular opening in the partition, openings through the reel-head for the passage of the tailings, and a casing between the partition and the tail-end casing of the bolt, to prevent material from contact with the casing, substantially as set forth.

6. In a flour-bolt, the herein-described reel-head consisting of the trunnion, the circular plate 22, the casing-flange 23, the peripheral flange 28, the flour-guard 26, and the spokes connecting the peripheral flange with the casing-flange, substantially as set forth.

7. In a flour-bolt, the combination, with the beater-shaft and the reel-head provided with a trunnion which surrounds the beater-shaft, of a metal bridge-tree provided with bearings for the beater-shaft, the trunnions, and their connecting-gears, the bridge-tree and the lower portions of the bearings being in one piece of metal, substantially as set forth.

8. In a flour-bolt, the combination, with the beater-shaft and the reel-head provided with a trunnion which surrounds the beater-shaft, of a metal bridge-tree provided with bearings for the beater-shaft, the trunnions and their connecting-gears, the bearings for the trunnion, and the bearings for the inner ends of the gear-shafts projecting inward beyond the vertical plane of the outer face of the reel-head and having supporting-brackets, the bearings and the brackets being all formed in one piece of metal, substantially as set forth.

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

GEORGE T. SMITH.

Witnesses:
GEO. S. BENNETT,
WM. H. DICKEY.