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PATENTED AUG. 6, 1907.

L. H. LIVERMORE.

EARTH AUGER.

APPLICATION FILED FEB. 18, 1907.

2 SHEETS—SHEET 1.

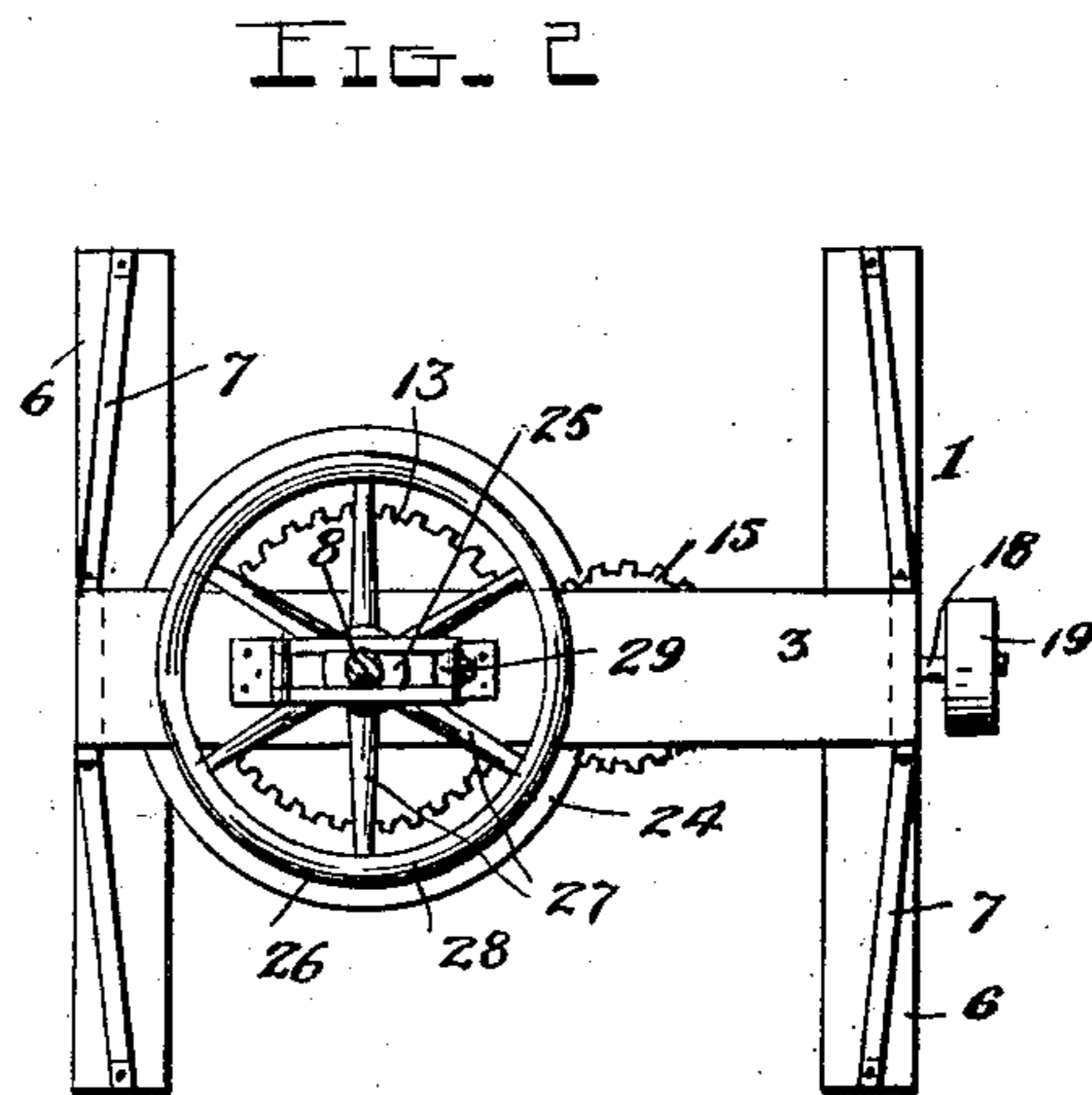
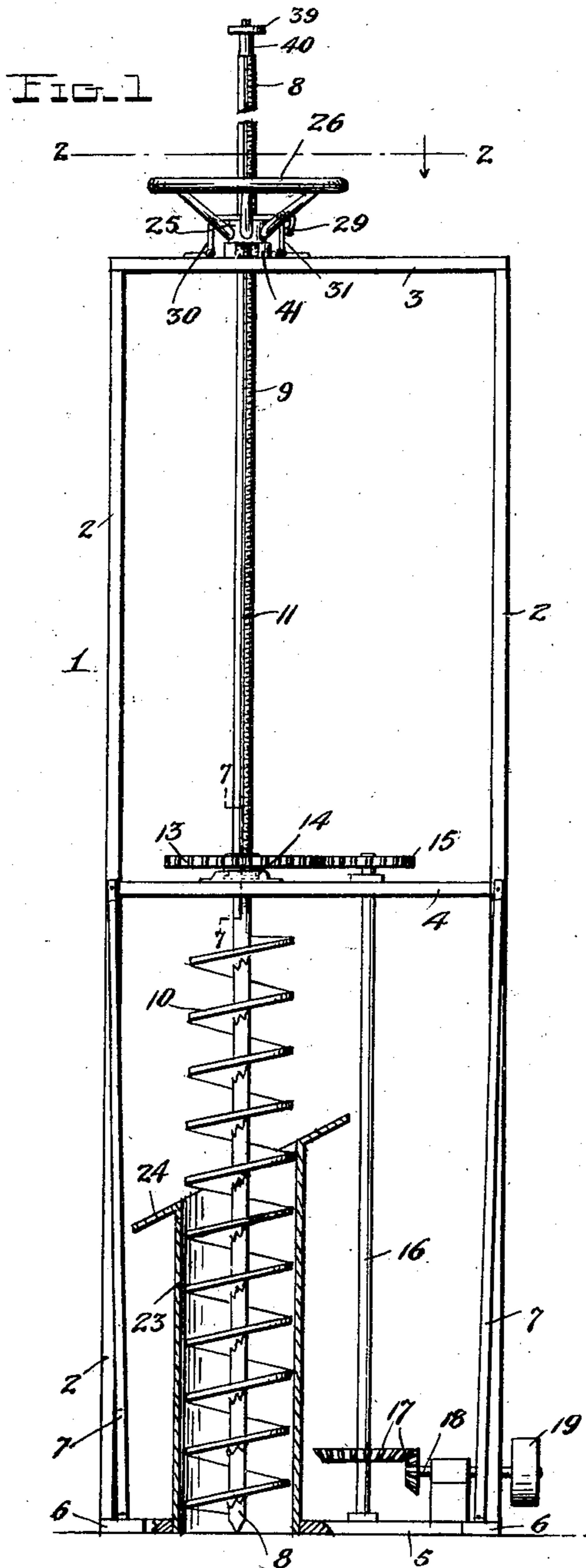
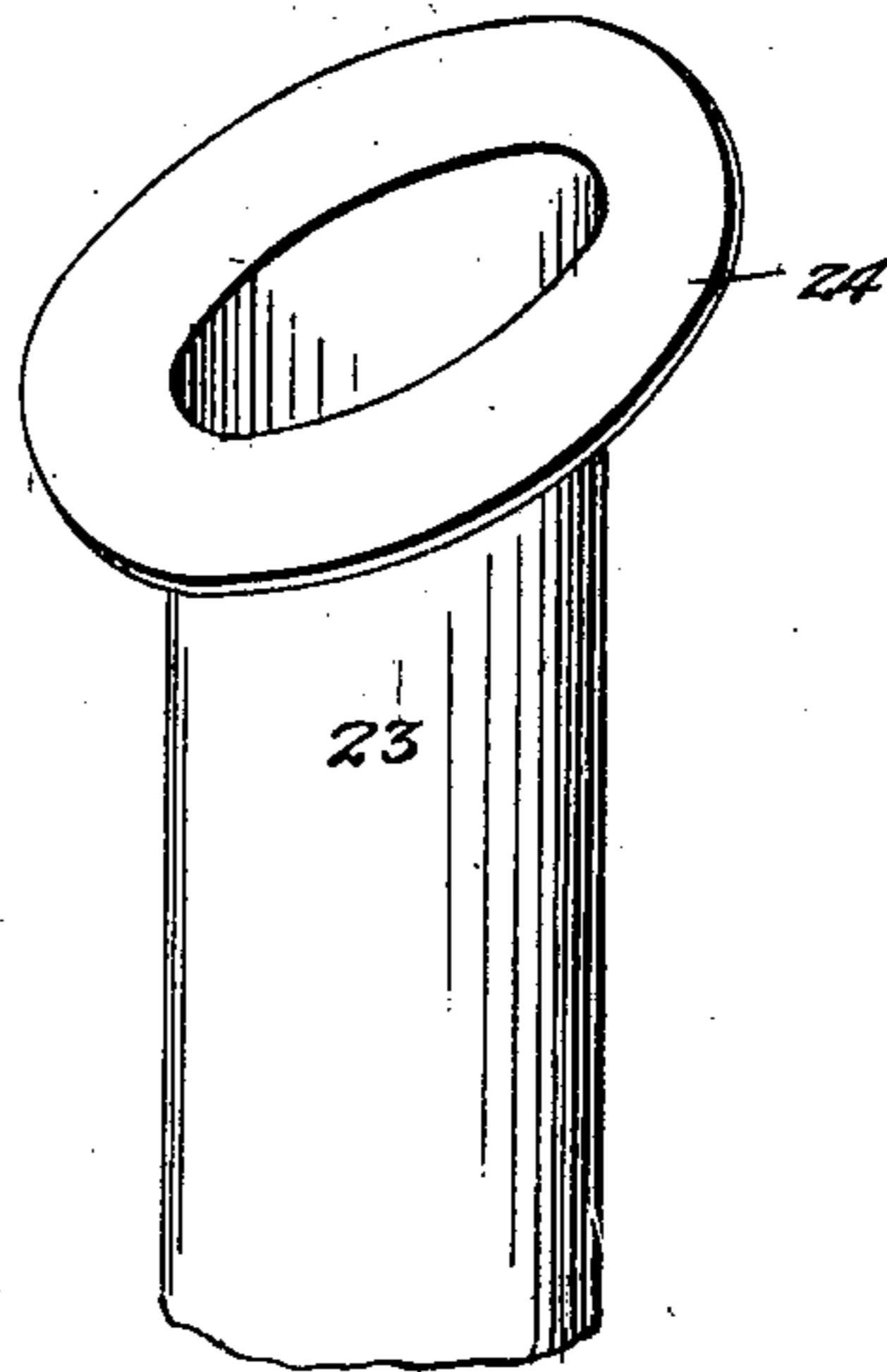


FIG. 3



Witnesses

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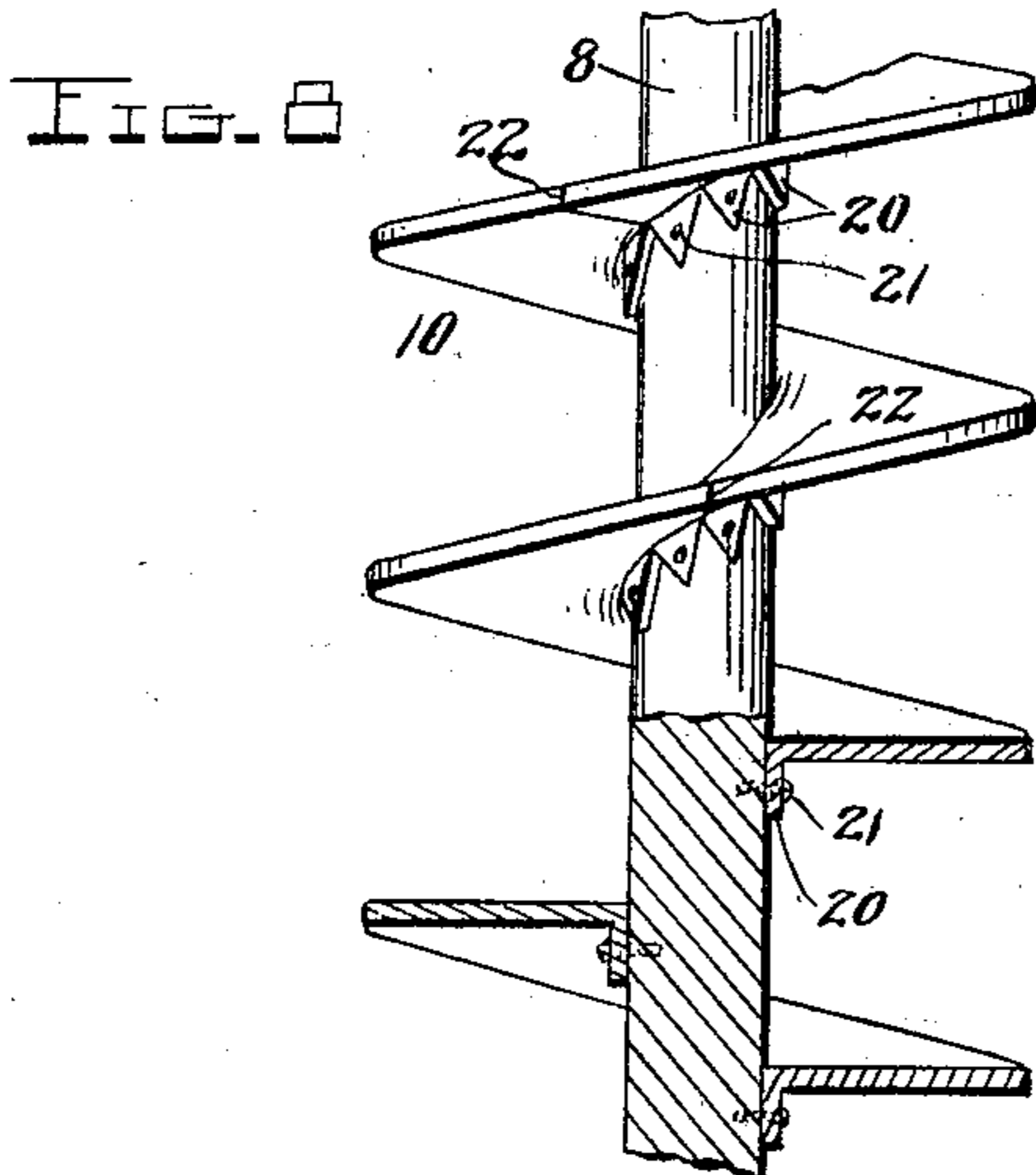
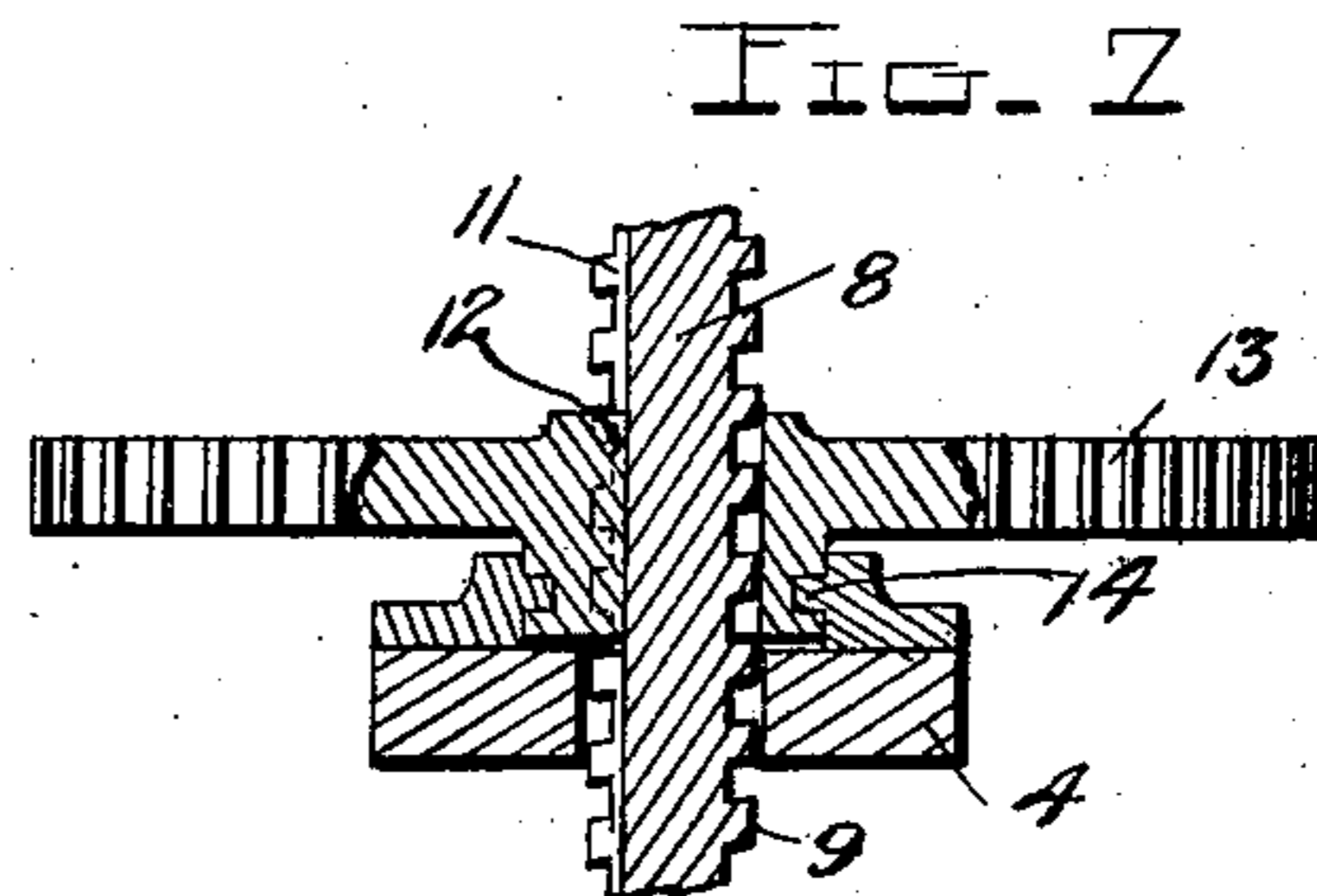
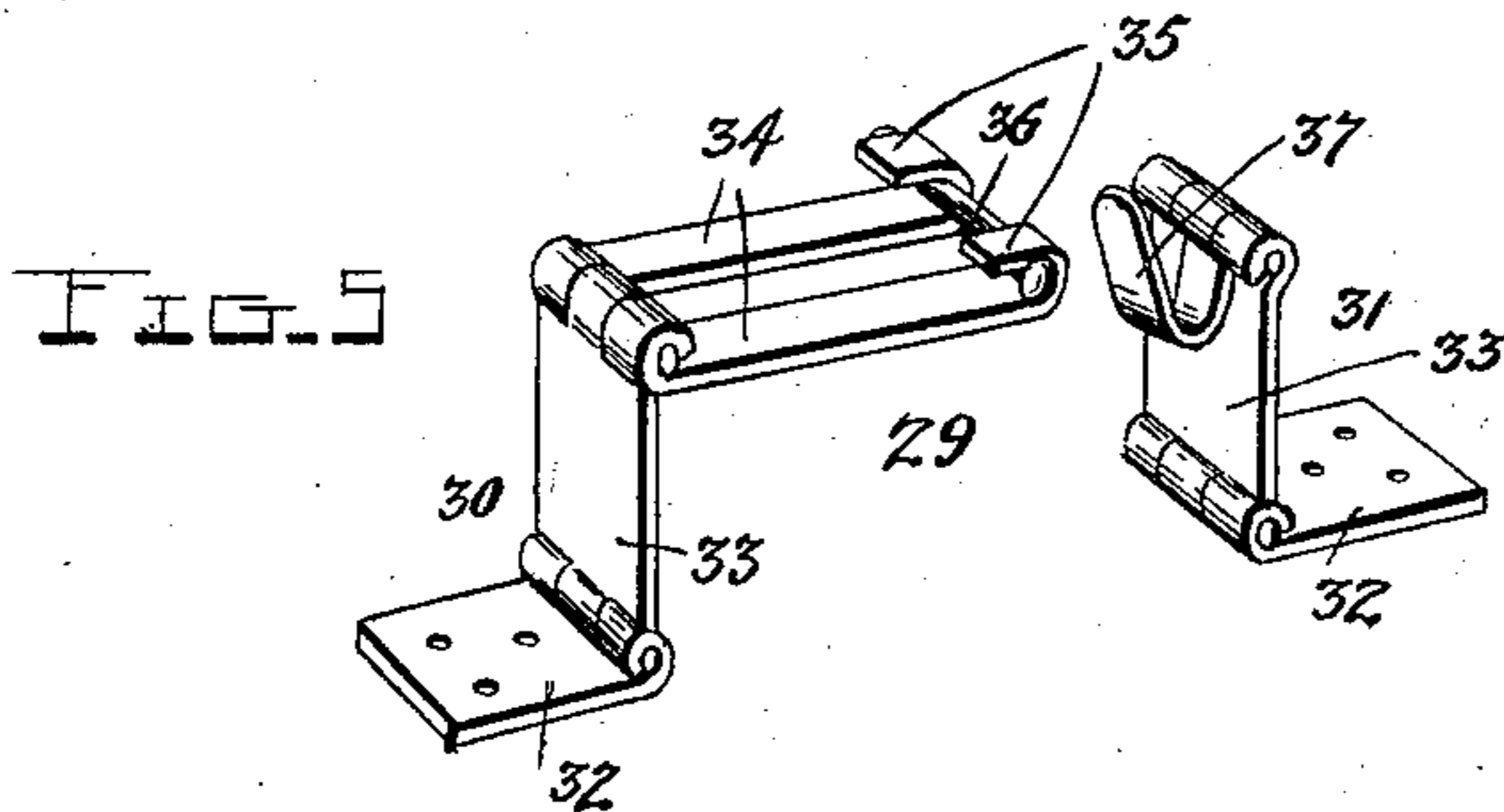
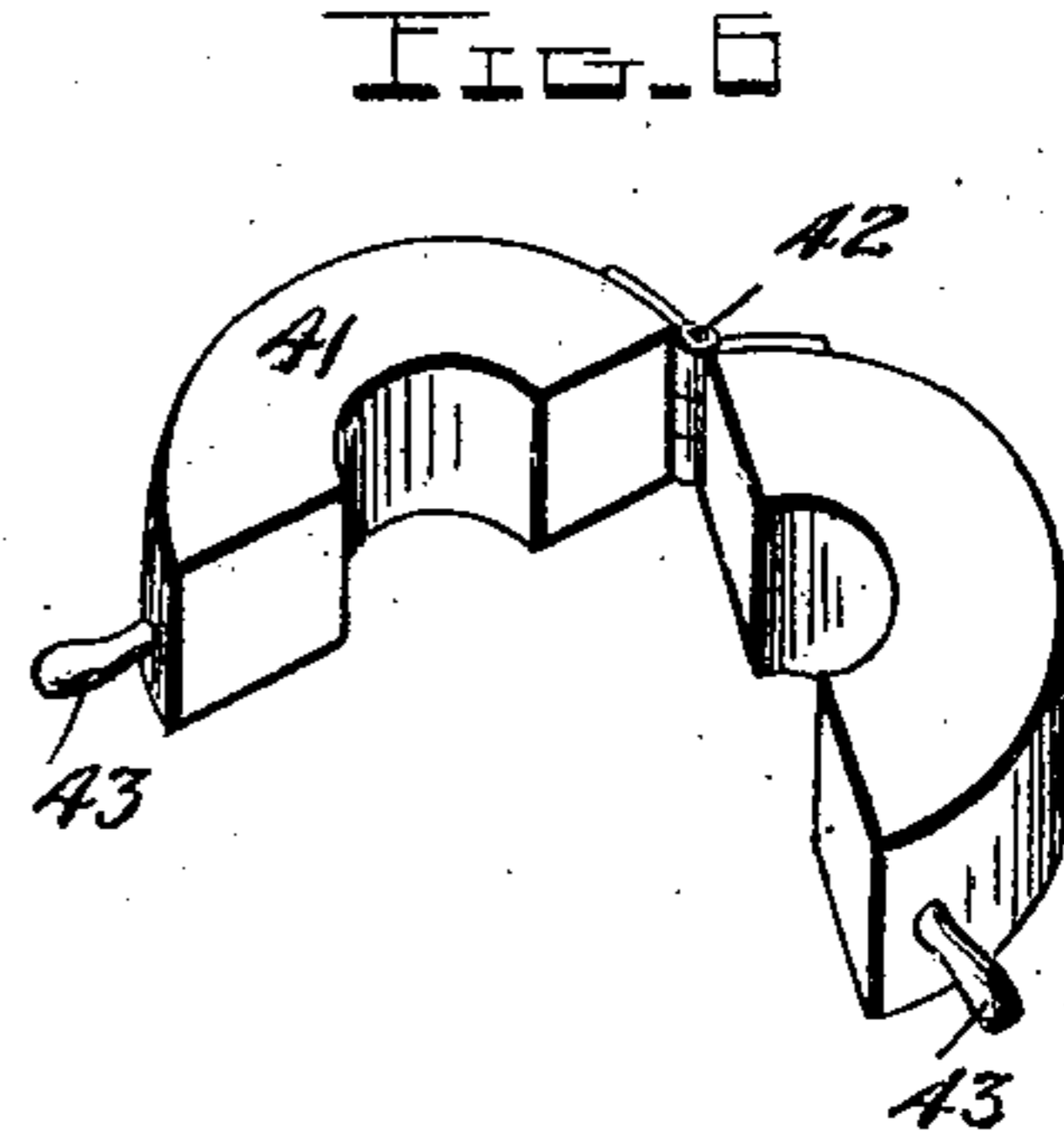
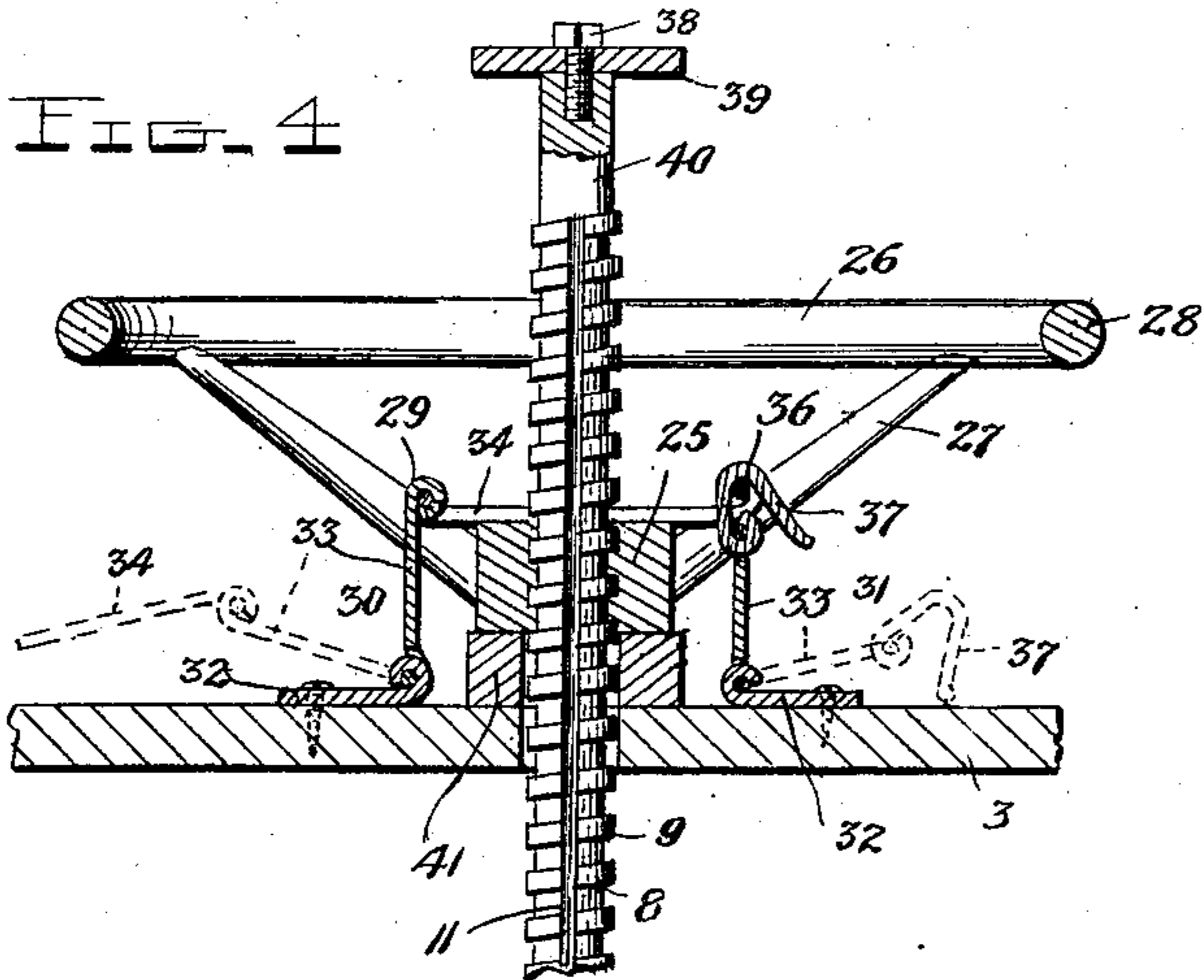
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L. H. LIVERMORE.
EARTH AUGER.

APPLICATION FILED FEB. 16, 1907.

2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

LEE H. LIVERMORE, OF YATES CITY, ILLINOIS.

EARTH-AUGER.

No. 862,406.

Specification of Letters Patent.

Patented Aug. 6, 1907.

Application filed February 16, 1907. Serial No. 357,634.

To all whom it may concern:

Be it known that I, LEE H. LIVERMORE, a citizen of the United States, residing at Yates City, in the county of Knox and State of Illinois, have invented certain new and useful Improvements in Earth-Augers, of which the following is a specification, reference being had therein to the accompanying drawing.

My invention relates to improvements in earth augers and more particularly to machines of this character especially designed for use in digging post holes.

The object of the invention is to provide a machine of this character which is of simple and comparatively inexpensive construction and which is very effective for the purpose intended.

With the above and other objects in view, the invention consists in the novel construction, combination and arrangement of devices hereinafter described and claimed, and illustrated in the accompanying drawings, in which

Figure 1 is a front elevation, with parts in section, of my improved earth auger; Fig. 2 is a top plan view of the same, the upper end of the screw shaft being in section; Fig. 3 is a perspective view of the upper end of the sleeve or cylinder which surrounds the auger proper; Fig. 4 is a detail vertical section, on an enlarged scale, through the top of the machine; Fig. 5 is a detail perspective view of the clasp or fastener; Fig. 6 is a perspective view of the two part washer; Fig. 7 is a detail vertical section taken on the plane indicated by the line 7—7 in Fig. 1; and Fig. 8 is a detail view partly in elevation and partly in section of the auger or screw.

The frame 1 of my improved earth auger consists of two uprights 2 connected by top, intermediate and bottom cross bars 3, 4, 5. This frame or support is held in an upright position by transversely extending beams or sills 6 connected to the bottom or lower bar 5 and also to the uprights 2 by inclined braces 7, as clearly shown in Figs. 1 and 2. Arranged vertically in the frame is a shaft 8, the upper portion of which is screw threaded, as shown at 9, and the lower portion of which carries an earth auger or excavating screw 10. The threaded portion 9 of the shaft is formed with a longitudinally extending groove 11 adapted to receive a key 12 arranged in a rotary element preferably in the form of a gear 13 through which said shaft passes. The key 12 permits the shaft to slide vertically through the gear but causes it to rotate therewith. The gear or element 13, as clearly shown in Fig. 7, has a swivel connection with the frame by being mounted in a bearing 14 arranged upon the intermediate cross bar 4, and it meshes with

a pinion or gear 15 secured upon the upper end of a vertical shaft 16 journaled in bearings on the bars 4, 5. The shaft 16 is connected by the beveled gears 17 to a horizontally arranged shaft 18 mounted in a suitable bearing upon the bar 5 and having upon its projecting outer end a pulley 19 or its equivalent by means of which the shaft 18 may be rotated.

The auger 10 is preferably constructed of sections which are secured upon the lower portion of the shaft 8, as clearly shown in Fig. 8. Each of these sections is in the form of a circular plate or sheet which is twisted into spiral form and has the edge of its central opening notched to provide attaching flanges which latter are bent downwardly and secured by screws, bolts rivets or other fastenings 21 to the shaft. The abutting ends or edges of the sections of the auger may be secured together, as shown at 22, or in any other suitable manner. Surrounding the auger is a cylindrical sleeve or casing 23 which has its lower end mounted in the lower cross bar 5 of the frame and its upper end surrounded by an annular flange 24 which is inclined downwardly and outwardly. The casing 23 retains the earth between the threads of the auger or screw until elevated above the open upper end of said casing and the flange 24 serves as a deflector which discharges the earth to one side of the machine and away from the gearing 17, as will be readily understood upon reference to Figs. 1 and 3.

The threaded upper end 9 of the shaft 8 passes through an opening in the top cross bar 3 and also through a threaded nut 25 formed by the hub of a hand wheel 26. This wheel has its radiating spokes 27 projecting upwardly so that its rim 28 is elevated above the hub or nut 25. When the shaft 8 is rotated to cause the auger 10 to enter the ground, the nut or hub 25 is held stationary upon the frame so that the threads 9 of the shaft working through the nut or hub will cause the shaft to move downwardly. The nut is held stationary by means of the clasp or fastener 29, clearly shown in Figs. 4 and 5. This clasp consists of two members 30, 31, each of which has an attaching plate 32 to which is hinged or pivoted an upright plate 33. The attaching plates 32 are secured upon the top bar 3 on opposite sides of the shaft 8 and to the upper end of the plate 33 of the member 30 are hinged or pivoted two bars 34, formed at their outer ends with hooks 35. The bars 34 are adapted to be swung across the top of the nut or hub 25 on opposite sides of the shaft 8 and their hooks 35 are adapted to receive a removable pin 36 with which is engaged a pivoted hook 37 on the upright plate 33 of the member 31. When the two members of the clasp are engaged with each

other, as shown in full lines in Fig. 4, their upright plates 33 project between the spokes 27 of the hand wheel and thus hold the latter against rotation. When said members are disengaged from each other, they may be swung outwardly and downwardly to their dotted line position shown in Fig. 4 and thus free the hand wheel.

In order to prevent the shaft 8 from being screwed downwardly out of the nut 25 I provide upon the upper end of the shaft a stop 39 preferably in the form of a washer or plate which is secured by a bolt 38. I also provide upon said end of the shaft a smooth or unthreaded portion 40 of a length corresponding to the thickness of the nut 25. It will be seen that when the shaft is screwed downwardly the stop 39 will prevent the upper end of the shaft from passing through the nut and the unthreaded portion 40 of the shaft will permit the latter to turn in the nut. The auger is elevated out of the hole which it makes by rotating the hand wheel 26 in a direction which will cause the threads 9 of said shaft to move upwardly through the nut 25. When the shaft 8 has been screwed to the limit of its downward movement, the threads 9 leave the threads in the nut 25 so that when the hand wheel is turned to elevate the auger it will be impossible to cause the threads in the nut 25 to take up or engage the threads 9 of the shaft. In order to overcome this difficulty, I provide between the bottom of the nut or hub 25 and the top bar 3, a spacing element preferably in the form of a two part washer or spacing block 41 which when removed will permit the nut 25 to drop sufficiently to enable it to reengage the threads 9 of the shaft. This washer 41 consists of two semi-circular sections hingedly connected, as at 42, and provided at their free ends with finger pieces or handles 43.

The construction, operation and advantages of the invention will be readily understood from the foregoing description taken in connection with the accompanying drawings.

In Fig. 1, the machine is shown ready for digging a hole for a post or the like, and this may be accomplished by applying power to the shaft 18. When that is done, the motion of the shaft 16 will be imparted to the gear 13 and the key 12 in the latter will cause the shaft 8 to rotate with it. The rotation of the shaft 8 causes it to move downwardly through the hub or nut of the hand wheel, the clasp 29 holding said hand wheel against rotation. When the auger has been screwed down to the desired extent, the shaft 18 is stopped, the clasp 29 is opened and the hand wheel 26 is turned to elevate the shaft 8 and hence the auger. Should the shaft be lowered to the limit of its downward movement it will be necessary to remove the two part washer 41 before the nut or hub of the hand wheel can be engaged with the threads 9 of the shaft.

The machine may be readily transported and may be adapted for digging holes for fence posts, telegraph poles and for other purposes.

Having thus described my invention what I claim and desire to secure by Letters Patent is:—

1. A machine of the character described comprising a frame, a screw shaft carrying an auger, means for rotating

said shaft, a rotatable nut upon the frame to receive the screw shaft and a device pivoted upon said frame and adapted to be swung into engagement with said nut to prevent it from rotating.

2. A machine of the character described comprising a frame, a screw shaft carrying an auger, means for rotating said shaft, a hand wheel having a threaded hub to receive said screw shaft, and a clasp upon said frame to engage said hand wheel and prevent it from rotating.

3. A machine of the character described comprising a frame, a screw shaft carrying an auger, means for rotating said shaft, a hand wheel having a threaded hub to receive said screw shaft, and a fastening device pivotally mounted upon said frame and adapted to be swung into engagement with the spokes of the hand wheel to hold it stationary.

4. A machine of the character described comprising a frame, a screw shaft carrying an auger and having a longitudinal groove in its threaded portion, a rotary element upon said shaft and having a key to slidably engage said groove, a swivel connection between said element and said frame, means for rotating said element, a hand wheel having a threaded hub to receive said shaft and means upon said frame to engage said hand wheel and hold it stationary.

5. A machine of the character described comprising a frame, a rotatable screw shaft carrying an auger, a hand wheel having a threaded hub to receive said screw shaft and radiating spokes, and a fastening device for the hand wheel having a portion to enter between the spokes and to straddle said screw shaft.

6. A machine of the character described comprising a frame, a rotatable screw shaft carrying an auger, a hand wheel having a threaded hub to receive said screw shaft and radiating spokes, and a fastening device for the hand wheel comprising two members arranged on the frame on opposite sides of the screw, one member having a portion to extend across said hub and between the spokes and to be engaged by the other member, substantially as set forth.

7. A machine of the character described, comprising a frame, a nut thereon, an auger carrying screw shaft to travel through said nut, said shaft having an unthreaded portion and means for limiting the longitudinal movement of the shaft in one direction when its unthreaded portion enters said nut, substantially as and for the purpose set forth.

8. A machine of the character described, comprising a frame, a rotatable nut thereon, means for holding said nut stationary, an auger carrying screw shaft to work in said nut, said shaft having an unthreaded portion, means for limiting the longitudinal movement of the shaft in one direction when the unthreaded portion of the shaft enters the nut, and means for permitting the nut to reengage the screw threads of the shaft, substantially as and for the purpose set forth.

9. A machine of the character described comprising a frame, a screw shaft carrying an auger, the upper end of the shaft having an unthreaded portion and a stop, a rotary nut upon said shaft, means for holding said nut stationary and a removable spacing element for supporting said nut.

10. A machine of the character described comprising a frame, a screw shaft carrying an auger, the upper end of the shaft having an unthreaded portion and a stop, a rotary nut upon said shaft, means for holding said nut stationary, and a removable sectional spacing washer or block for supporting said nut, substantially as and for the purpose set forth.

11. A machine of the character described comprising a frame, a screw shaft having a longitudinal groove and an unthreaded portion, a stop at the upper end of said unthreaded portion of the shaft, an auger upon the lower end of said shaft, a gear swiveled upon said frame and having a key to slidably engage the groove in said shaft, means for rotating said gear, a hand wheel having a threaded hub to receive said screw shaft, a fastening device upon said frame to engage said hand wheel and hold it stationary and a removable sectional washer for supporting said hand wheel, substantially as set forth.

12. In a machine of the character described, a frame, a vertical shaft therein, an auger upon said shaft, a casing surrounding said auger and a deflector at the upper end of said casing.

5 13. In a machine of the character described, a frame, a vertical shaft therein, an auger upon said shaft, a casing surrounding said auger and a surrounding deflecting flange at the upper end of said casing inclined downwardly to one side of the same, substantially as described.

10 14. In a machine of the character described, a frame, a vertical shaft therein, an auger upon said shaft, means for

driving said shaft arranged in said frame to one side of said auger, a casing surrounding said auger and a deflecting flange at the upper end of the casing inclined downwardly and away from said driving means for the shaft, 15 substantially as described.

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

LEE H. LIVERMORE.

Witnesses:

C. V. BIRD,

P. GARRISON.