

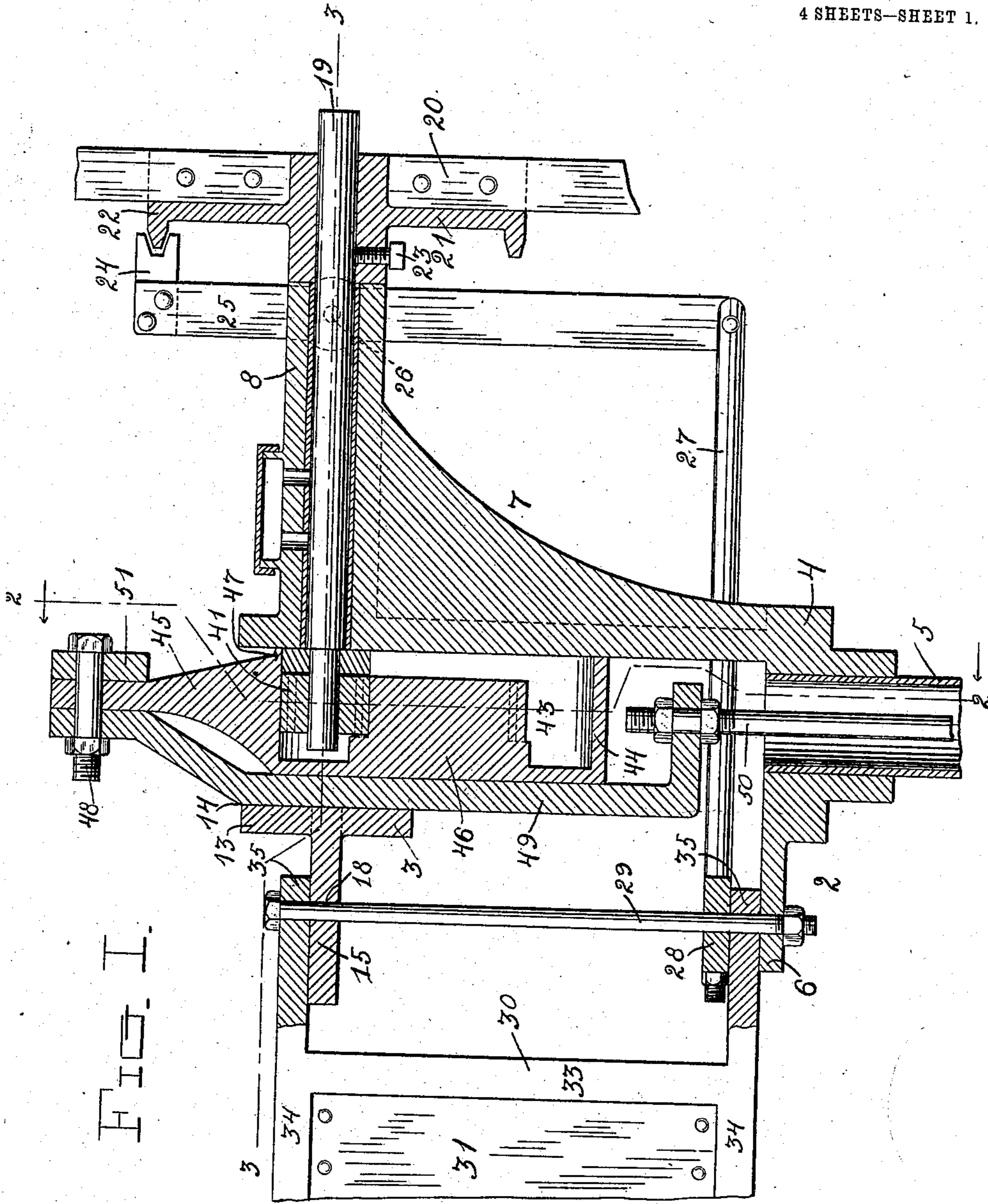
O. L. HUFFMAN.
WINDMILL GEAR.

APPLICATION FILED JUNE 13, 1907.

900.544.

Patented Oct. 6, 1908.

4 SHEETS—SHEET 1.



Witnesses

J. Milton Jester.
D. L. Nash.

O. L. Huffman *Inventor*

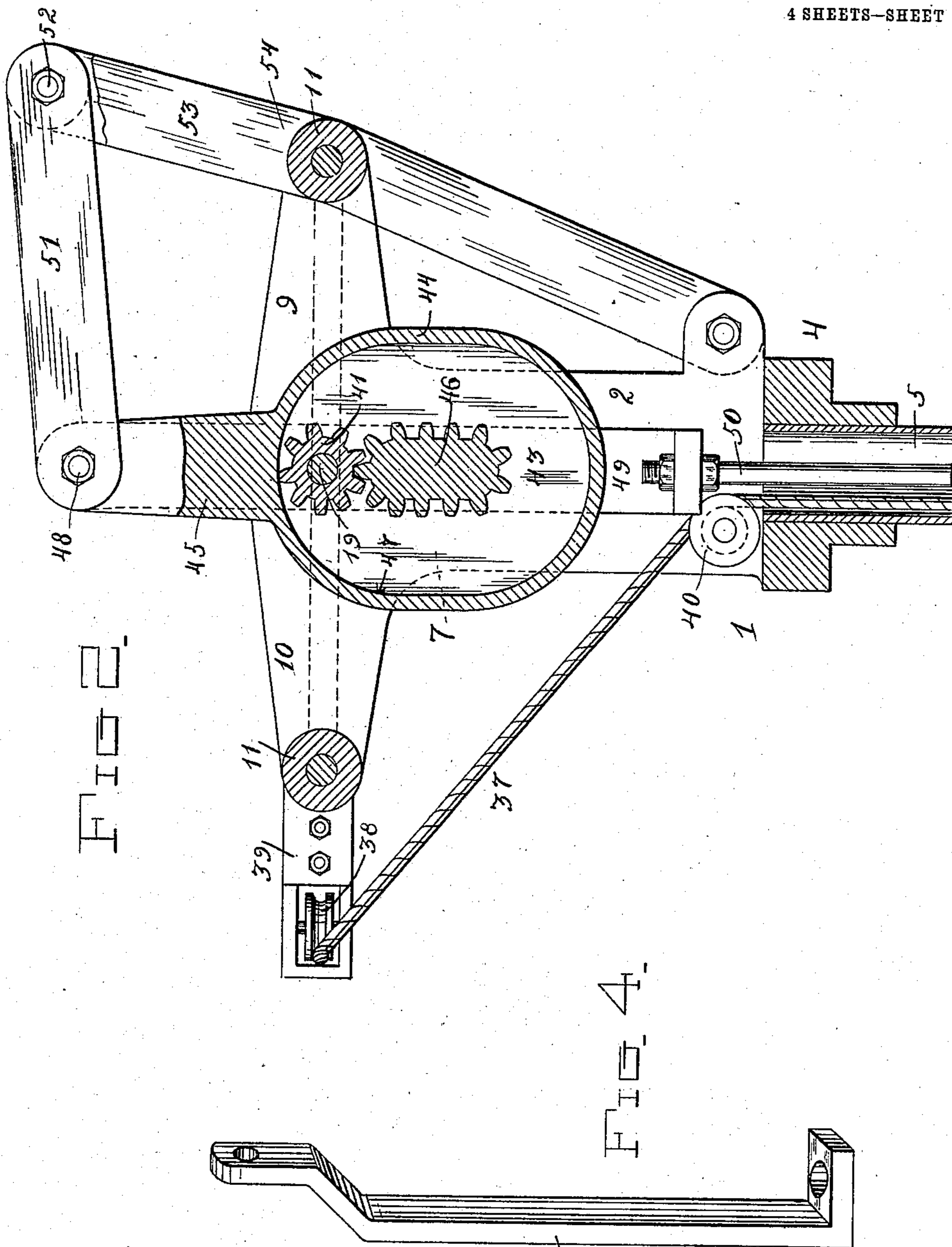
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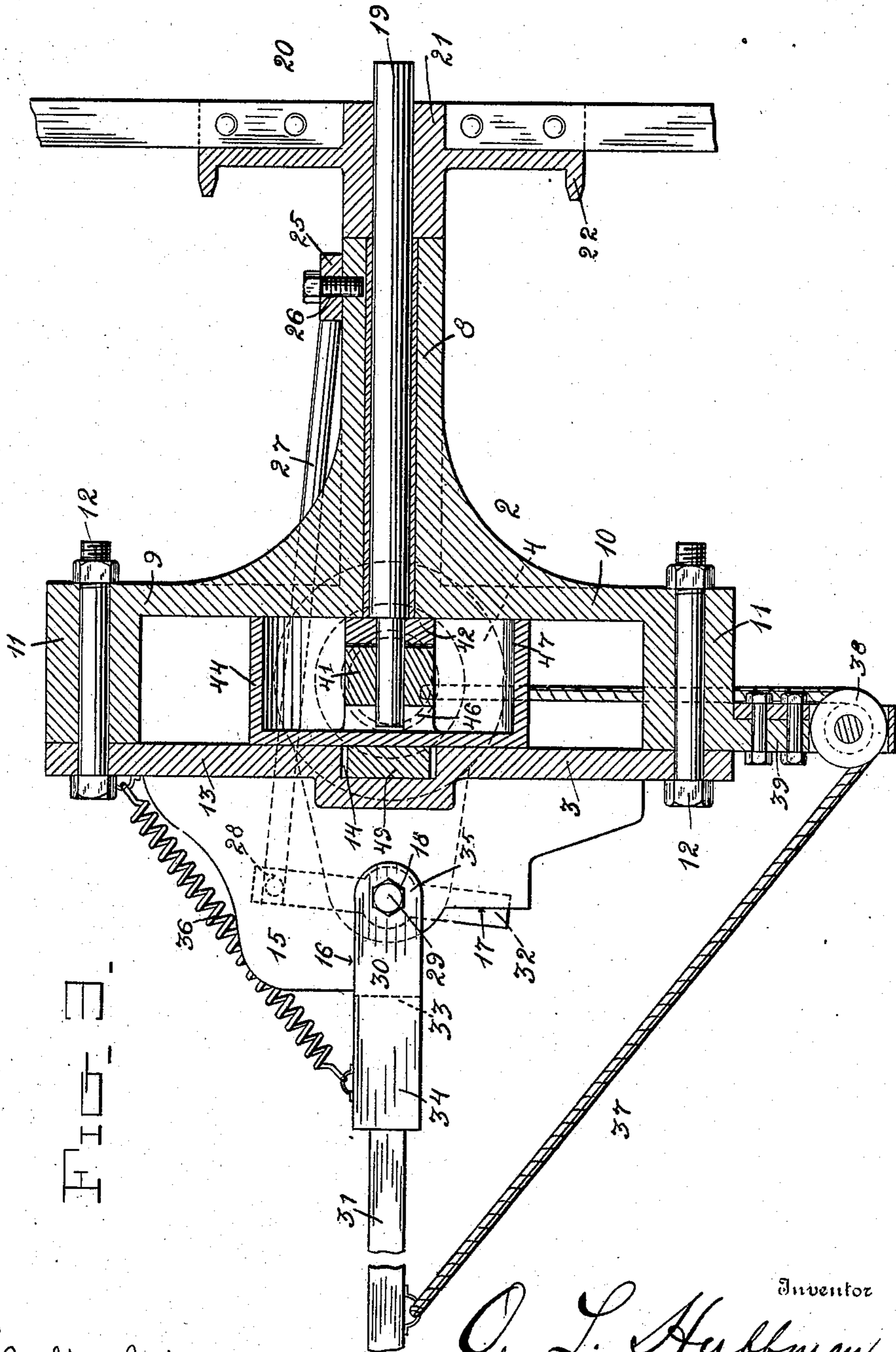


FIG. 3

Witnesses

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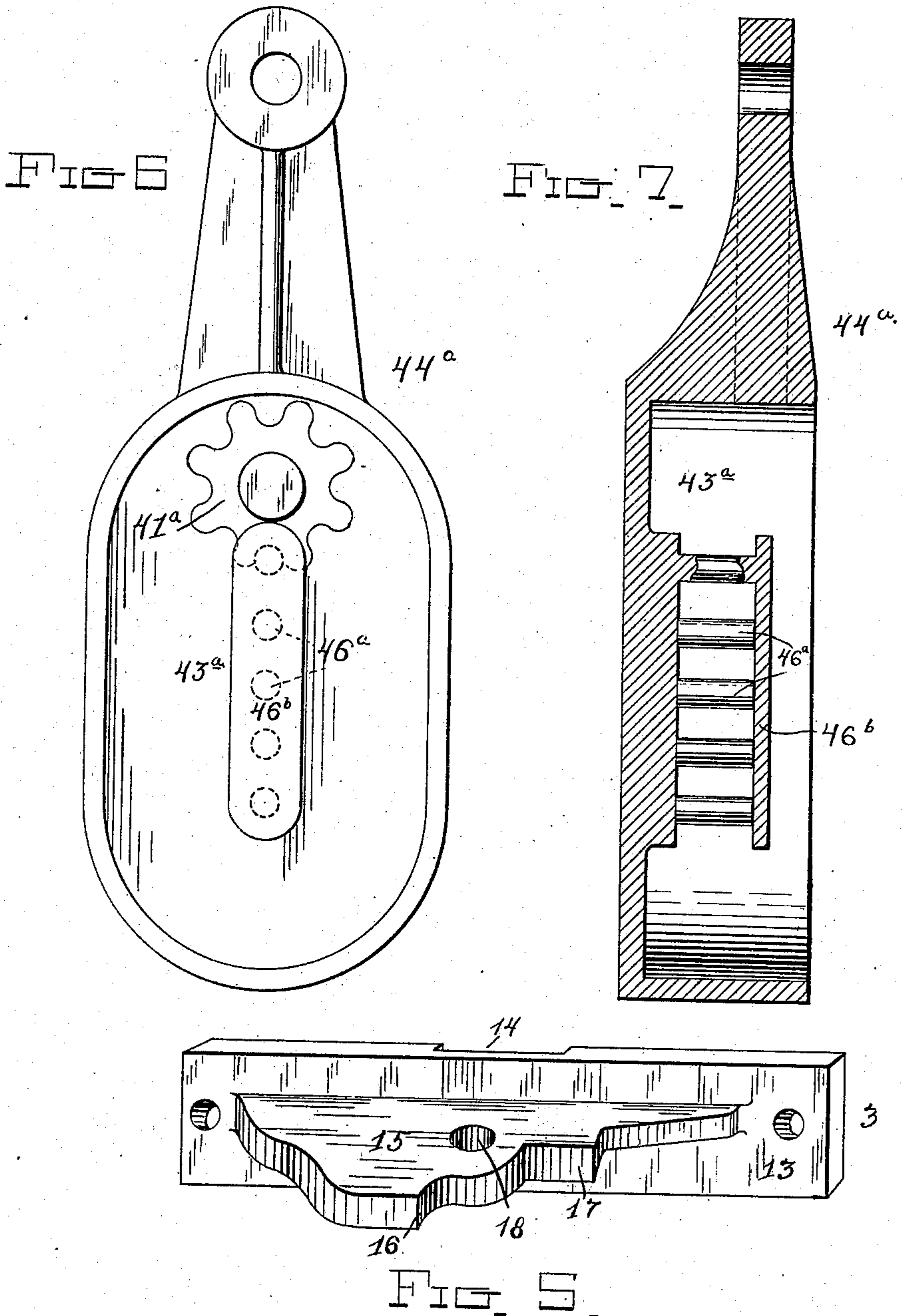
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4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

ORLA L. HUFFMAN, OF ERIE, KANSAS.

WINDMILL-GEAR.

No. 900,544.

Specification of Letters Patent.

Patented Oct. 6, 1908.

Application filed June 13, 1907. Serial No. 378,797.

To all whom it may concern:

Be it known that I, ORLA L. HUFFMAN, a citizen of the United States, residing at Erie, in the county of Neosho and State of Kansas, have invented certain new and useful Improvements in Windmill-Gears, of which the following is a specification, reference being had therein to the accompanying drawing.

My invention relates to improvements in gearing for converting rotary into reciprocatory motion, and more particularly to an improved gear for windmills.

One object of the invention is to provide gearing of this character which will be simple, strong and durable in construction and operation, and which will give the pump rod a long straight stroke with practically no lateral movement or vibration.

Another object of the invention is to provide an improved means for throwing the windmill out of operation and braking the movement of its wheel.

A further object of the invention is to improve and simplify the construction and operation of mechanisms of this character and to thereby render the same more durable and efficient and less expensive.

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

Figure 1 is a vertical longitudinal section through my improved windmill gear and brake mechanism; Fig. 2 is a vertical transverse section on the plane indicated by the line 2—2 in Fig. 1; Fig. 3 is a horizontal section on the plane indicated by the line 3—3 in Fig. 1; Fig. 4 is a detail perspective of the pump rod slide; Fig. 5 is a similar view of the removable guide and bearing member of the rotary head or turn table; Fig. 6 is a front elevation of a modified form of the rack yoke; and Fig. 7 is a vertical longitudinal section through the same.

In the drawings, 1 denotes the rotary head or turn table of the windmill which consists of a main body member 2 and a removable guide and bearing member 3. The main member 2 of the turn table has its lower end shaped to provide a head 4 which is adapted to be mounted for rotation in a suitable bed plate or support and which is provided with a concentrically disposed depending tubular guide 5. From one side of the head 4 pro-

jects a lateral apertured bearing ear 6 and from its opposite side rises an upright or standard 7 formed at its top with a horizontally disposed and right angularly projecting bearing 8 and also outwardly and oppositely projecting arms 9, 10, which are disposed in a horizontal plane and arranged upon the opposite sides of the bearing 8 at its inner end. These arms 9, 10 are formed at their ends with apertured projections 11 to which are secured by bolts or the like 12 the apertured ends of the member 3. By constructing said arm with the projections 11 and uniting the member 3 to them, as clearly shown in Fig. 3, it will be seen that an opening is provided in the upper portion of the windmill turn table or head directly above the tubular guide 5. The member 3 has a vertically disposed portion 13, in the inner face of which is formed a centrally disposed and vertically extending guide groove or channel 14 and from the outer face of which projects a horizontally disposed portion or flange 15 having its outer edge cut away or recessed to provide two right angularly disposed stop shoulders 16, 17 and also having a vertical aperture 18 arranged in vertical alinement with the aperture in the bearing lug or ear 6 for a purpose presently explained. The bearing 8 is adapted to receive a shaft 19 of a wind wheel 20 which latter has its blades secured upon one side of its hub 21 and upon the opposite and inner side of the latter is formed an annular friction brake surface 22. Said hub 21 of the wheel is secured upon the projecting outer end of the shaft 19 preferably by means of a set screw 23, as clearly shown in Fig. 1. The brake surface 22 is preferably V-shaped in cross section, as shown, and it is adapted to be engaged by a similar shaped brake shoe 24 carried by the upper end of a brake shoe lever 25 pivoted intermediate its ends at 26 upon one side of the bearing 8. The lower end of the lever 25 is connected by a rod or link 27 to one end of an operating lever 28 which latter is pivoted intermediate its ends upon a vertical bolt or pivot 29 which pivotally connects the hanger 30 of the vane 31 to the lug 6 and the flange 15, as clearly shown in Fig. 1. The brake operating lever 28 has its free end 32 projecting normally into the path of a portion of the vane hanger 30, which latter comprises a vertically extending portion 33 formed upon one side with outwardly projecting arms 34 to which the vane 31 is secured and

upon its other side with bearing lugs or ears 35 apertured to receive the pivot 29. The hanger 30 is adapted to swing between the stop shoulders 16, 17 upon the flange 15 of the member 3 and it is held normally against the stop 16 by a coil spring 36, as shown in Fig. 3. When in its normal position the vane projects at right angles to the plane of the wind wheel and hence holds the latter to the wind; and when the hanger is swung into engagement with the stop 17 the vane is disposed parallel with the plane of the blade for an obvious purpose. The hanger is swung against the stop 17 to throw the mill out of gear by drawing downwardly upon a cable 37 suitably attached to the vane and passed over a grooved wheel or pulley 38 journaled in a bracket 39 upon the arm 9 and also over a similar grooved wheel 40 suitably journaled upon the lower portion of the member 2 of the windmill head or turn table. The cable 37 extends downwardly through the tubular guide 5 and its lower end hangs within convenient reach at the bottom of the windmill tower. It will be seen that when the cable is drawn downwardly the vane will be swung against the stop shoulder 17 to throw the wind wheel out of the wind and that when the cable is released the spring 36 will restore the vane to its normal position so that the wheel will be held to the wind.

A cog wheel or pinion 41 and an anti-friction roller 42 are arranged upon the inner end of the shaft 19, the pinion being fixed to the shaft and the roller loosely mounted. The roller and pinion are disposed in an oblong groove or channel 43 formed in one face of a yoke 44 which has at its upper end an apertured arm 45 by means of which it is suspended in the opening between the members 2, 3 of the turn table. The pinion 41 meshes with a rack 46 of oblong form arranged within the groove 43 and it is kept continuously in engagement with the rack by the roller 42, which latter contacts with the outer wall 47 of said groove, as will be readily understood upon reference to Fig. 1. The arm 45 of the rack yoke 44 is connected by a pivot bolt or the like 48 to the bent or offset upper end of a slide 49 adapted to reciprocate vertically in the guide groove 14 formed in the member 3. The lower end of the slide 49 is bent at right angles and apertured to receive the upper end of the pump rod 50 or a similar connection which extends downwardly through the tubular guide 5. The pivot bolt 48 also connects the upper ends of the yoke and slide to one end of a link 51 which has its other end pivoted at 52 in the forked upper end of a bracket 53 which latter has its lower end 54 extending downwardly and inwardly and connected to the arm 9 and also to the base portion of the member 2 so as to form an inclined brace for the upright or standard 7. The link 51 serves to steady and guide the

yoke 44 and the slide 49 as they are reciprocated. The swinging movement of the link causes the yoke and slide to have a slight lateral movement; and to permit the slide to have such movement, its guide groove 14 is made sufficiently wide, as will be seen upon reference to Fig. 3.

In Figs 6 and 7 of the drawings I have illustrated a modified form of the rack yoke 44 which may be substituted for the one shown in the remaining figures of the drawings and described above. This yoke 44^a only differs from the yoke 44 in the construction of the rack which, as clearly shown in said figures consists of a vertical row of pins 46^a projecting from the bottom of the groove 43^a and united by a plate or bar 46^b. The pinion 41^a which co-acts with this modified form of the rack has rounded cog teeth, as shown in Fig. 6, so as to more effectively engage the rack teeth formed by the pins 46^a.

In operation, it will be seen that as the wind wheel rotates, the pinion 41 will actuate the rack 46 and as said pinion travels around the rack, the yoke 44 and hence the slide 49 and the pump rod 50 will be reciprocated. Owing to the peculiar construction and arrangement of these parts it will be seen that the pump will be given a long straight stroke with practically no lateral movement or vibration. The latter is principally due to the provision of the slide 49 and the pivoting of the yoke 44 at the upper end of the slide. It will be further noted that this construction is compact and at the same time simple, strong and durable. When it is desired to throw the windmill out of gear it is only necessary to draw the cable 37 downwardly and to fasten it. When this is done, the vane is swung parallel with the wheel so that the latter will be held out of the wind. When the cable is thus operated to throw the mill out of gear, the vertical portion 33 of the vane hanger, as the latter swings against the stop 17, will contact and operate the end of the brake operating lever 28 so that the rod or link 27 will be drawn in a direction to actuate the lever 25 and throw the brake shoe 24 into frictional engagement with the brake surface 22 on the hub of the wind wheel. This construction therefore simultaneously throws the wind wheel out of gear and brakes its rotary movement.

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

1. In a gear for a wind mill or the like, the combination of a support provided with a bearing and a vertical guide groove or channel arranged opposite said bearing, a shaft in the bearing, a pinion upon the latter, a slide arranged in said guide groove or channel and having offset upper and lower ends, a rack yoke to co-act with the pinion arranged vertically between the offset ends of the slide

and horizontally between the latter and the bearing, the upper end of the yoke being pivoted to the upper offset end of the slide to pivotally suspend the yoke and a pump rod 5 connected to the offset lower end of the slide and disposed vertically beneath the yoke, substantially as and for the purposes set forth.

2. In a gear for a wind mill or the like, the 10 combination of a support provided with a bearing and a vertical guide groove or channel arranged opposite the bearings, a shaft in the bearing, a pinion upon the shaft, a slide arranged in said guide groove or channel, a 15 rack yoke to co-act with the pinion arranged between the slide and the bearing, a pump rod connected to the lower end of the slide, a link pivoted at one end upon the support and a single pivot passing through the other end 20 of the link, the upper end of the yoke and the upper end of the slide, substantially as and for the purposes set forth.

3. In a gear for a windmill or the like, the 25 combination of a support provided with a bearing and a vertical guide groove or channel arranged opposite the bearing, a slide arranged in said guide groove or channel, a pump rod connected to the lower end of the slide, a yoke pivotally suspended from the 30 upper end of the slide and arranged between the slide and the bearing, said yoke having in one of its faces an oblong groove having a continuous outer wall, the inner wall of said groove being formed with teeth to provide a 35 continuous rack, the latter being disposed entirely within the groove, a shaft arranged in said bearing and having one of its ends projecting into the groove in the yoke, a pinion fixed upon the outer portion of said project- 40 ing end of the shaft and engaged with said rack and a roller journaled upon the inner portion of said projecting end of the shaft and arranged between said pinion and said bearing, said roller being adapted to engage 45 the continuous outer wall of the groove in the yoke to hold said pinion in mesh with said rack, substantially as described.

4. In a wind mill gear, the combination of 50 a support having a horizontal portion formed with stop shoulders 16, 17 arranged substantially at right angles to each other, a vertical pivot, a vane arranged upon said pivot, a spring for actuating the vane in one direc- 55 tion and holding it normally against one of said stop shoulders, the brake operating lever 32 fulcrumed intermediate its ends upon said pivot and having one of its ends disposed ad-

jacent to the other stop shoulder and in the path of the vane, means for actuating the vane against the tension of said spring to 60 cause it to actuate said lever and engage the last mentioned stop shoulder, a wind wheel, a brake device for the latter, and means connected to the other end of the brake operating lever 32 for actuating said brake device, 65 substantially as set forth.

5. In a windmill gear, the combination of a head or turn table having a tubular lower portion and an open upper portion provided with a guide and a bearing, a shaft arranged 70 in said bearing, a slide arranged in said guide and having offset upper and lower ends, a pump rod connected to the lower end of said slide and projecting through the tubular base portion of the turn table, a yoke having an 75 arm at its upper end and an oblong groove in one face with a rack formed in said groove, a link pivoted at one end to the turn table, a pivot connecting said link, said arm of the yoke, and the upper end of said slide, a 80 pinion upon said shaft arranged in said groove in the yoke and in mesh with said rack and a roller journaled upon said shaft and adapted to engage the outer wall of the groove in the yoke, substantially as and for 85 the purpose set forth.

6. In a wind mill gear, the combination of a support having a horizontal portion formed with stop shoulders arranged substantially 90 at right angles to each other, a vertical pivot, a vane arranged on said pivot, a spring for actuating the vane in one direction and holding it normally against one of said stop shoulders, a lever pivoted intermediate its 95 ends and having one end arranged adjacent to the other stop shoulder and in the path of the vane, means for actuating the vane against the tension of its spring to cause it to operate said lever and to engage the last 100 mentioned stop shoulder, a wind wheel shaft, an annular brake surface carried thereby, a brake lever pivoted intermediate its ends upon the support and carrying a brake shoe at one end to engage said brake surface and a link connecting the other end of the brake 105 lever and one end of the first mentioned lever, substantially as set forth.

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

ORLA L. HUFFMAN.

Witnesses:

R. C. JOHNSON,
ETTA TOM.