

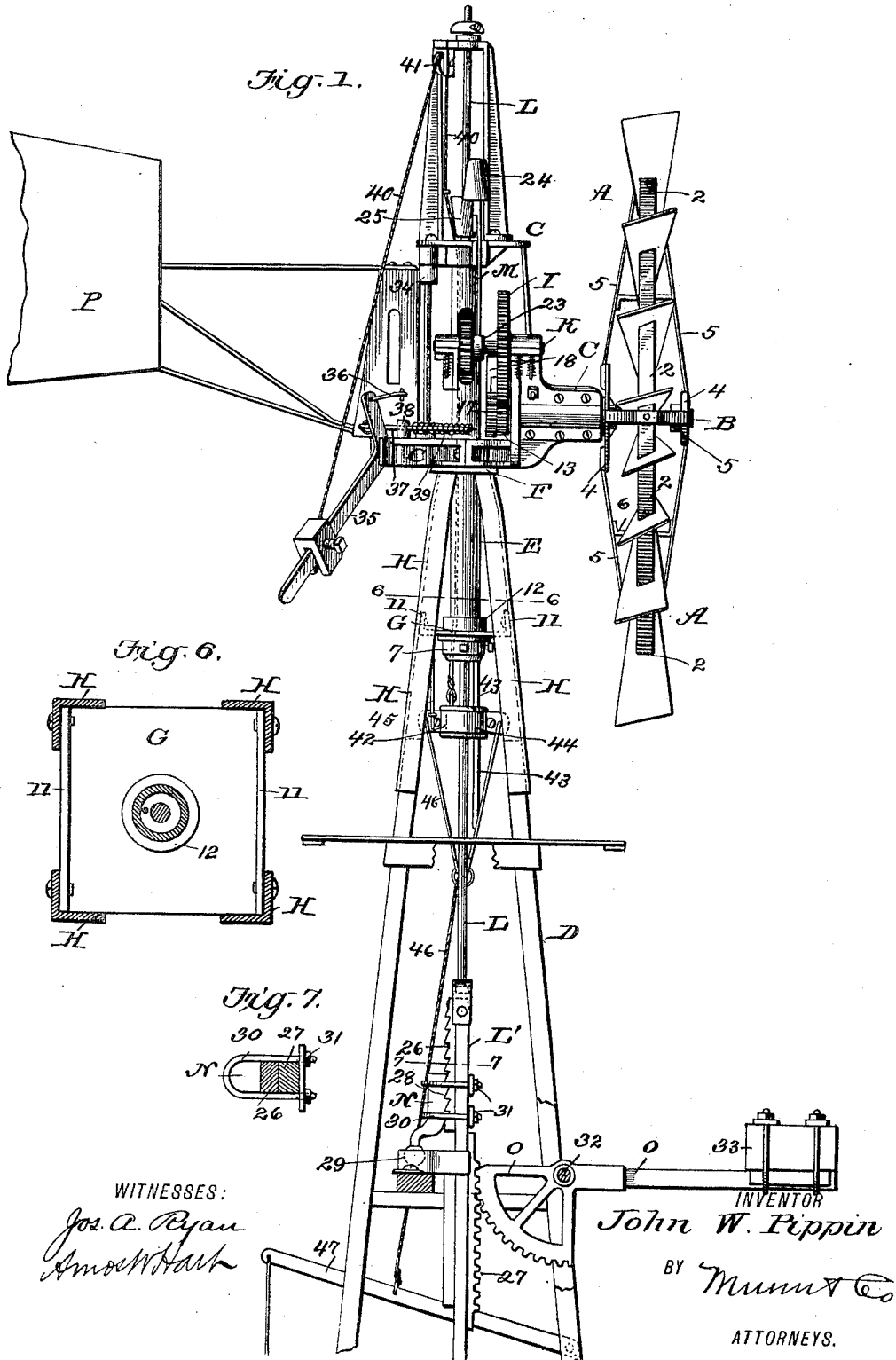
(No Model.)

3 Sheets—Sheet 1.

J. W. PIPPIN.
WIND WHEEL.

No. 581,613.

Patented Apr. 27, 1897.



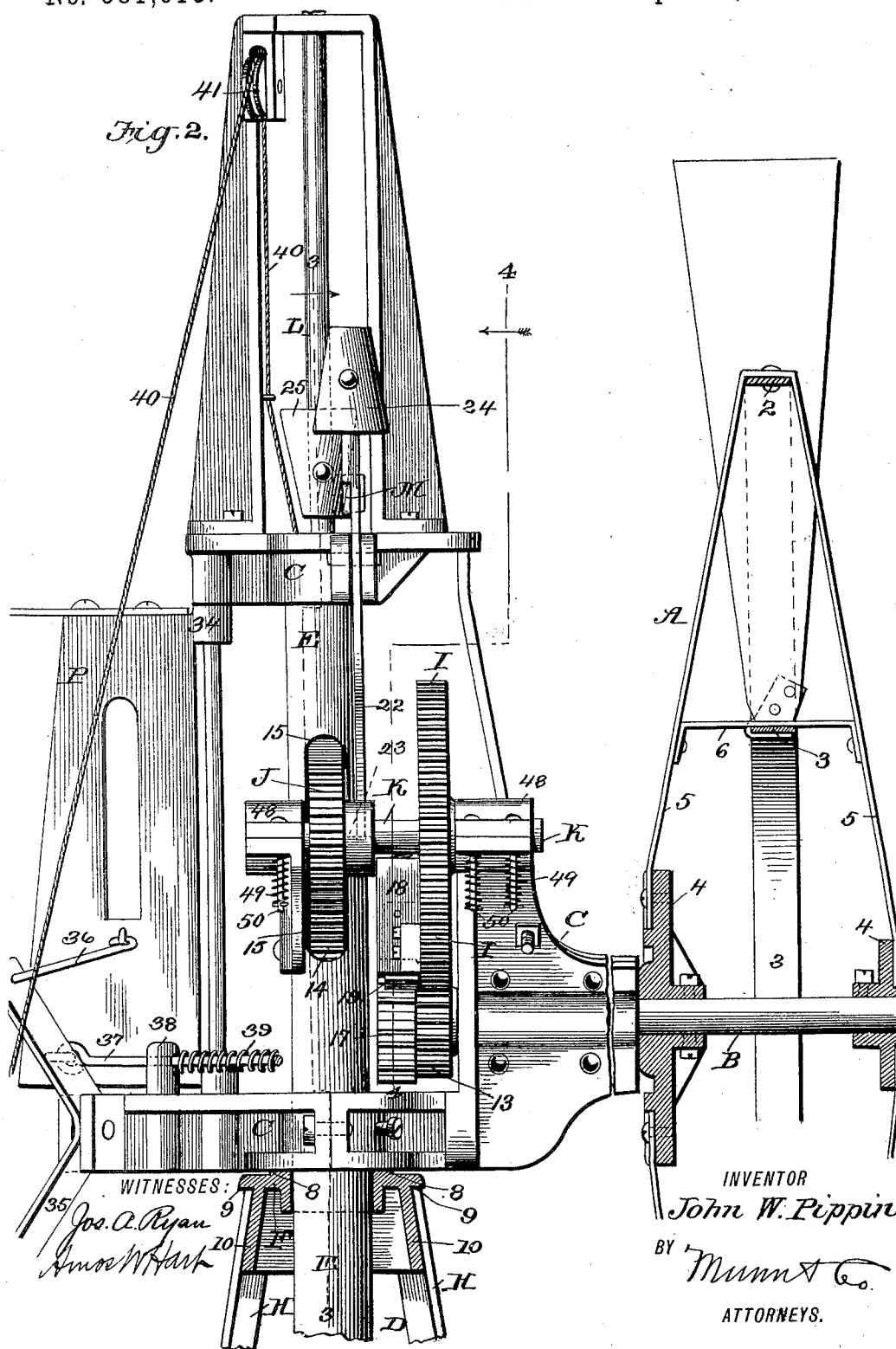
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3 Sheets—Sheet 2.

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WIND WHEEL.

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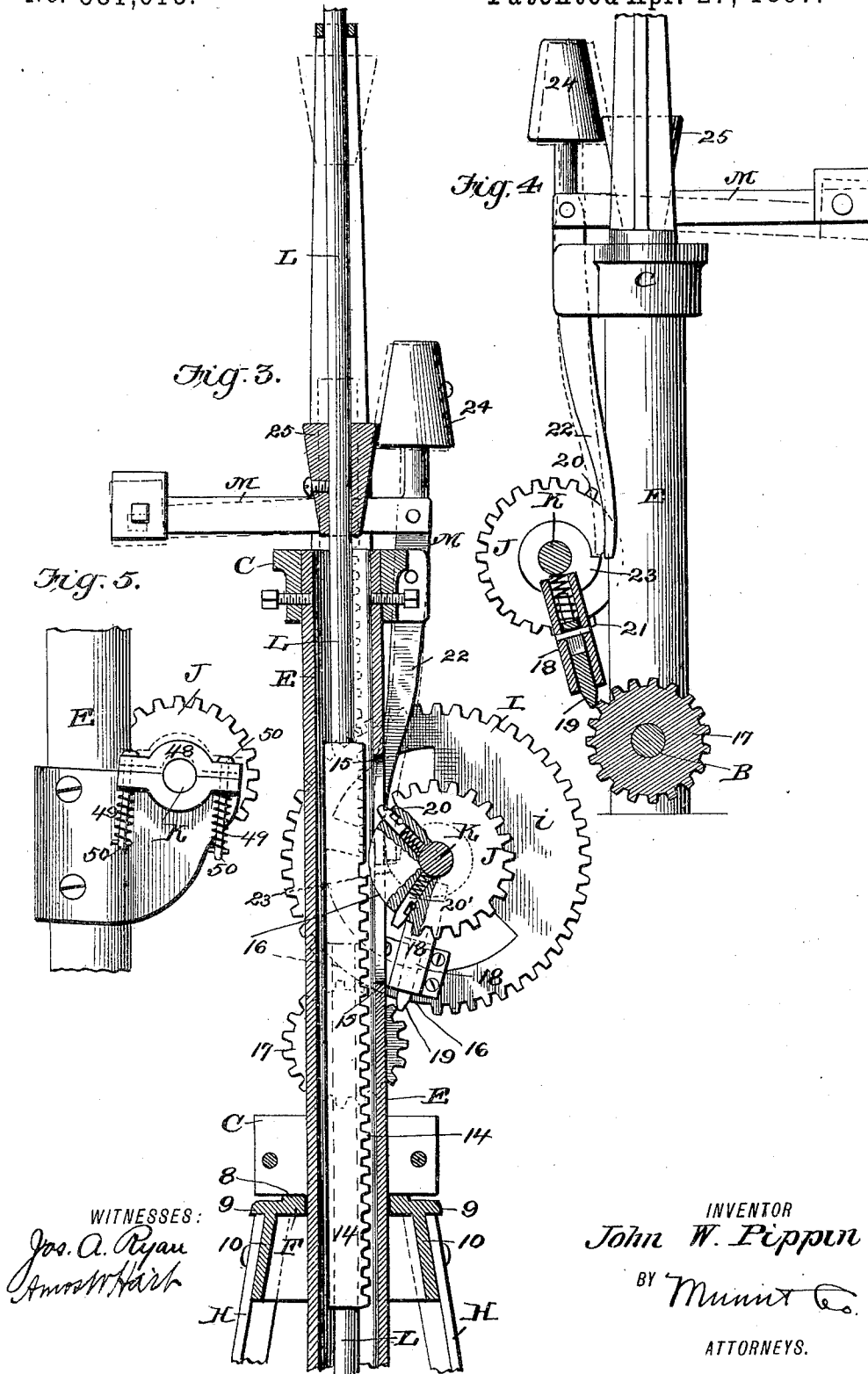
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UNITED STATES PATENT OFFICE.

JOHN WILLIAM PIPPIN, OF ROCK SPRINGS, TEXAS.

WIND-WHEEL.

SPECIFICATION forming part of Letters Patent No. 581,613, dated April 27, 1897.

Application filed December 23, 1896. Serial No. 616,788. (No model.)

To all whom it may concern:

Be it known that I, JOHN WILLIAM PIPPIN, of Rock Springs, in the county of Edwards and State of Texas, have invented a new and useful Improvement in Wind-Wheels, of which the following is a specification.

This invention has reference to vertical wind-wheels, and is designed to secure a rapid descent of the pump-rod and thus enable the wheel to raise more water in a given time.

My invention further relates to means for relieving the shock incident to rapid descent of the pump-rod, whereby severe shock and injury to the wheel proper are avoided.

In the accompanying drawings, three sheets, Figure 1 is a side view of my wind-wheel complete. Fig. 2, Sheet 2, is an enlarged side view of the upper portion of the apparatus, the tower and wheel proper being, however, in section. Fig. 3, Sheet 3, is a vertical section on line 3 3 of Fig. 2. Fig. 4 is a side view and vertical section of the upper portion of the apparatus on line 4 4 of Fig. 2. Fig. 5, Sheet 3, is a detail view of the bearings of one of the shafts. Fig. 6 is an enlarged horizontal section on line 6 6 of Fig. 1. Fig. 7 is a detail section on line 7 7 of Fig. 1.

The wheel proper, A, is arranged vertically and keyed on a horizontal shaft B, which is journaled in a rotatable skeleton frame C, supported by the skeleton tower D. The body of the wheel A, Figs. 1 and 2, is composed of the following parts: Vanes or blades are arranged radially and set transversely inclined to the axis of the wheel, being secured in position by an outer circular band 2, that passes through them, and an inner concentric band 3, to which their inner ends are riveted. Such wheel-body is attached to the disks 4, clamped on the shaft B, by means of supports 5 and braces or cross-ties 6, arranged as follows: Said supports are converging arms or spokes of V shape, formed of pieces of strap-iron, whose ends are bolted to the disks 4 and whose middle portion is bolted to the outer band 2. A cross brace or tie 6 is arranged between the members of each arm or spoke 5 and also bolted to the inner band. Thus the wheel-body is supported, braced, and attached to the shaft B by the same light and inexpensive means in the most secure and rigid man-

ner. The frame is constructed in sections or parts adapted to fit closely and secured together and clamped by screw-bolts upon the hollow cylindrical rotatable pivot-post E, Figs. 1 and 2. Said post E is arranged vertically and has its bearing in the tower-platform F and the subjacent flanged horizontal brace or web G and is held detachably by means of a screw-clamped collar 7, directly beneath the brace G. (See Fig. 1.)

The weight of all the rotatable parts—the wheel A, frame C, post E, and attachments—is borne by the platform F, the same having a circular boss at 8, Fig. 2, on which the frame C rests and turns.

The platform F is rectangular and has a horizontal ledge or lateral shoulder 9 and a downwardly-projecting flange 10 and is bolted to and supported by angle-irons H, which are extensions of the tower-legs—that is to say, the said irons H fit upon and are screwed to the corners or angles of the pendent platform-flange 10 and their ends abut the ledge 9 of the latter, so that the parts are firmly secured together and constitute a light but strong skeleton support for the rotatable parts.

The brace or web G, Figs. 1 and 6, has lateral flanges or ribs 11, that serve to strengthen it, and also a flange or boss 12, that forms a bearing for the pivot-post E. It fits against and is bolted at the corners to the angle-irons H, as shown, thus tying the latter together and bracing them as well.

On the inner end of the wheel-shaft B is keyed a pinion 13, that meshes with a mutilated gear I, keyed on a counter-shaft K, arranged above the wheel-shaft B. On the same shaft K with said gear I is keyed a smaller mutilated gear J, that meshes intermittently with a rack 14, arranged and working in guides within the hollow post E and forming part of the pump or stroke rod L. As shown in Fig. 2, the side of the hollow post E is cut away or slotted at 15 to permit such engagement of the gear I and rack 14.

As shown in Fig. 3, the vacant or plain peripheral spaces 16 of the gears I and J are so arranged relatively to the pinion and rack that when the larger one I is free from the pinion 13 the smaller one J is disengaged from the rack 14. It is apparent that the ro-

tation of the wheel A will impart like motion to the gears I and J and that the pump-rod L will be thereby raised and then released and allowed to drop or descend suddenly, such movement of the rod L occurring once for every rotation of said gears. I will now describe certain accessories or attachments which contribute to this operation and result.

On the wheel-shaft B, alongside the pinion 13, is keyed a spur-gear 17, having slightly longer teeth than said pinion. On the side of the large gear I, Figs. 2 and 3, is arranged a guide or keeper 18, in which is held a spring-projected tooth 19, which is adapted to engage the gear 17 once in each rotation of the gear I. A spring-projected tooth 20, Fig. 3, is also arranged at each end of the series of integral or fixed teeth possessed by the gear J. The spring-teeth 20 are in peripheral line with the others, being held in radial sockets in the gear J and normally projected by spiral springs arranged behind them. The gear I is weighted on one side, as shown.

The function of the aforesaid spring-teeth 19 of gear I is to catch in the gear 17, and thus cause said gear I to again mesh with the pinion 13 after the pump-rod L has made its descent, and the slight rotary movement of the gear I, which is necessary to enable the tooth 19 to thus engage the gear 17, is due to the weighted side *i* of said gear, which is arranged about a quarter of a circle removed from the spring-tooth 19, so as to exert the required leverage.

The function of the spring-teeth 20 of the smaller mutilated gear J is as follows: One tooth 20 serves to release the rack 14 and avoid clash and danger of breaking teeth as the pump-rod makes its rapid descent, and the other tooth 20' serves to reengage the rack 14, after descent of the pump-rod, also without clash, shock, or jar to the apparatus. In other words, the spring-teeth 20 20' respectively and alternately release and pick up the pump-rod as the gear J rotates intermittently.

It is necessary the rotation of the gears I J shall be arrested at the instant the gear J lets loose the rack 14, and this function is performed by the automatic locking and releasing device about to be described.

A weighted elbow-lever M, Fig. 3, is pivoted to the frame C, and its vertical arm 22 engages a wiper-wheel 23 on the counter-shaft K at once the gear I and rack 14 are disengaged. On the upper end of the vertical arm 22 of said lever M is clamped a cone 24, and a like cone 25 is clamped in inverted position on the pump-rod L, in such relation to the lever-cone 24 that as the pump-rod L descends said cone will strike the lever-cone 24, and thus trip the lever M and release the gear-shaft.

The portion of the pump-rod L of which the rack 14, before referred to, forms a part is swiveled to a lower portion L', having racks 26 27 on opposite sides. To the first or upper one, 26, of said racks is attached a device

N, which is a stop for arresting the descent of the pump-rod at a definite point, so that injury to the pump-valve is prevented. Said device consists of a short rack-bar 28, having an offset at its lower end that seats in a socket 29, fixed on the frame C. The bar 28 is adjustable vertically on the rack 27, being detachably secured thereto by means of U-shaped clamp-screws 30 and nuts 31.

I provide a counterbalance for the pump-rod in the form of a pivoted and weighted segment-lever O, which meshes with the lower rack 27, as shown in Fig. 1. The lever O is pivoted on a cross-shaft 32, secured in the frame C, and a weight-box 33 is secured adjustably to its outer end.

It will be seen that when the pump-rod L descends the weighted end of the lever O is raised, so that the leverage and resistance increase as the pump-rod approaches the limit of its downward stroke. The lever O also practically balances the pump-rod and its attachments, so that the load of water may be lifted with the expenditure of comparatively little power.

The vane or tail P, Fig. 1, is pivoted to the frame C at 34 and is held elastically in the wind by means of a weighted elbow-lever 35, which is pivoted to the frame C at its angle and connected with the vane by a link 36, also by a spring attachment composed of a rod 37, that slides in a stud 38 on the frame and is encircled by a helical spring 39.

A wire rope 40 is connected with said lever 35 and runs over a pulley 41 at the top of the frame and down through the hollow pivot-post E to a flanged block 42, that slides on the pump-rod section L, and a fixed pendent guide-rod 43 and is held in a transverse bar or clamp 44, that also slides on a fixed pendent guide-rod 45. From such clamp 44 a wire 46 extends to a hand-lever 47, by which the vane P may be thrown and held out of the wind and the wheel proper, A, thereby thrown out of action when desired.

The caps 48 (see Fig. 5) of the bearings of counter-shaft K are held down by springs 49, applied to pins 50, passing through the entire bearing, so that the said caps will yield and allow the shaft K to rise slightly, as shown by dotted lines, in case the gear J should become accidentally engaged with the rack 14 in an abnormal way. By this means danger of injury to the gearing is avoided.

I do not propose to restrict the use of my invention to pumps alone, since it is applicable for drilling and several other kinds of work.

What I claim is—

1. In a wind-wheel, the combination with the slidable stroke-rod having a rack as specified, the wheel-shaft and a pinion thereon, of a mutilated gear engaging said pinion, a smaller mutilated gear rotating with the first gear, and meshing with the rack on the stroke-rod, said gears having their vacant or plain peripheral surfaces arranged partly out of

coincidence as shown and described for the purpose specified.

2. In a wind-wheel, the combination, with the slidable stroke-rod having a rack as specified, the wheel-shaft and a pinion thereon, of the gear I, engaging said pinion, the smaller gear J, fixed on the same shaft with gear I, and meshing with the rack, the said gears being mutilated, or having vacant peripheral spaces, which are arranged relatively to the pinion and rack as shown, whereby the latter two are free from engagement simultaneously, so that the stroke-rod may descend by gravity, as specified.

3. In a wind-wheel, the combination, with the stroke-rod, the wheel-shaft, and a pinion and gear 17 keyed on the latter, of a large mutilated gear weighted as specified, a retractible spring-tooth arranged to slide in a keeper on the side of such gear and adapted to engage said gear 17, a smaller mutilated gear keyed on the shaft of the larger gear and having its plain or mutilated portion opposite the corresponding portion of the smaller gear, spring-teeth arranged in the latter at the ends of the row of fixed gear-teeth.

4. In a wind-wheel, the combination with the wind-wheel shaft, a pinion and gear 17 keyed thereon, mutilated gears having spring-teeth and keyed on a counter-shaft, the stroke-rod having a rack which the smaller mutilated gear intermittently engages, and an automatic stop for locking the counter-shaft, and means for tripping said device when the stroke-rod descends, substantially as shown and described.

5. In a wind-wheel, the combination with the stroke-rod having an inverted cone mount-

ed thereon, a weighted and pivoted locking-lever carrying a cone adapted to come in contact with the first when the stroke-rod descends, the counter-shaft having a shoulder which said locking-lever engages, the mutilated gears keyed on said counter-shaft, and the wind-wheel shaft and a pinion keyed thereon, as shown and described.

6. The combination with the tower proper, of the rectangular platform having a pendent angular flange, the angle-irons fitted and bolted to the angles, the horizontal web or lower platform arranged between the angle-irons and bolted to the same on the inner side, as shown and described.

7. In a wind-wheel, the combination with a reciprocating stroke-rod, having a rack on its lower portion, of an adjustable stop composed of a rack-arm and clamp, and a socket or contact-piece on the frame, as shown and described.

8. In a wind-wheel, the combination, with the wheel proper, the stroke-rod having racks as specified, a mutilated gear meshing with one of the racks, and connections between said gear and the wheel-shaft, of the pivoted, weighted lever having a toothed segmental head engaging the lower rack, and a stop, as shown and described, whereby, after having been lifted, the stroke-rod is released and left free to descend, and the lever exerts gradually-increasing resistance until the stop arrests the stroke-rod positively, as specified.

JOHN WILLIAM PIPPIN.

Witnesses:

C. T. CUPPLES,
L. B. HERINGTON.