(Model.)

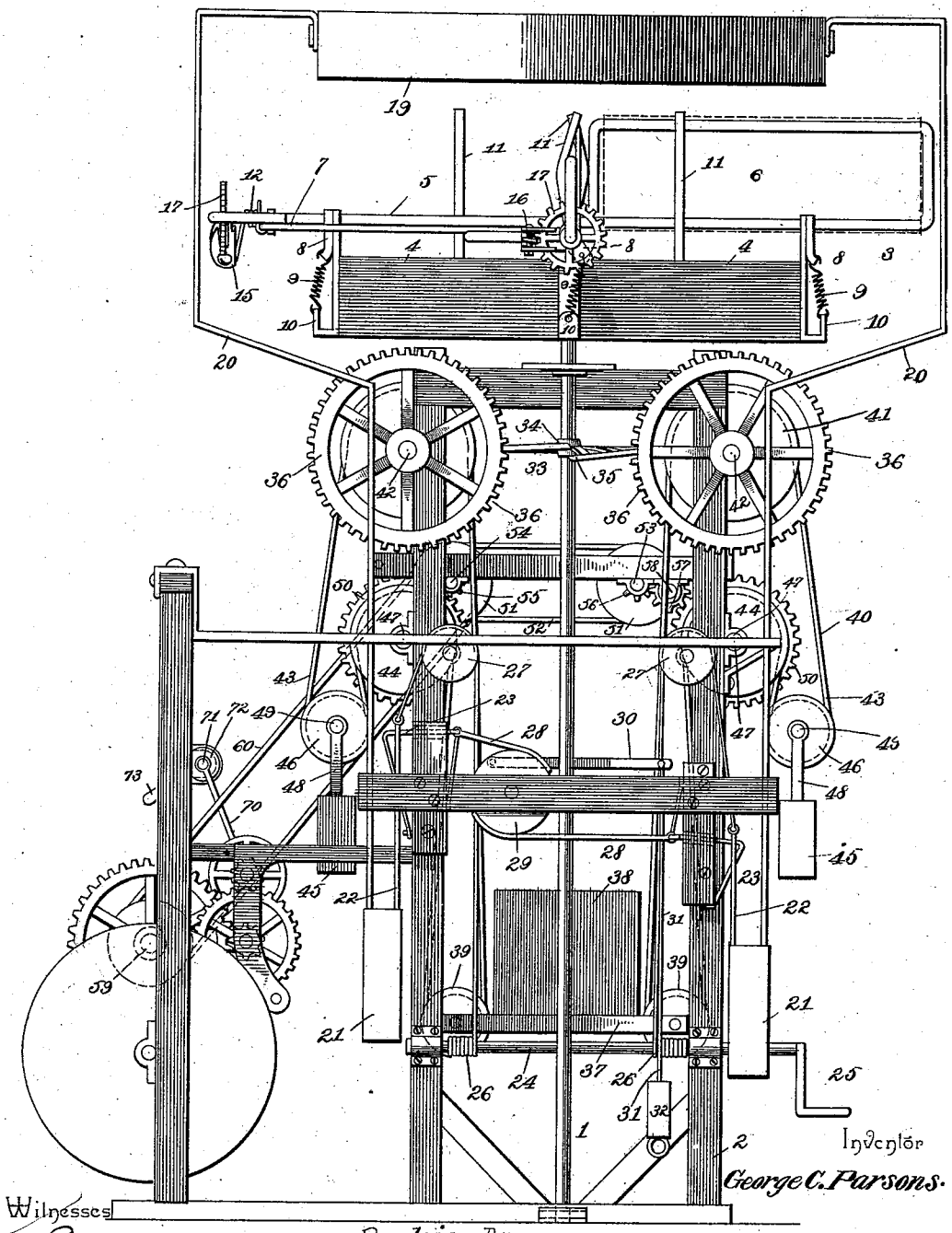
3 Sheets—Sheet 1.

G. C. PARSONS.

WIND ENGINE.

No. 549,741. Patented Nov. 12, 1895.

FIG. 1.



Witnesses
C. H. Monroe
J. F. Riley

Inventor
George C. Parsons.
By his Attorneys.
C. A. Snow & Co.

(Model.)

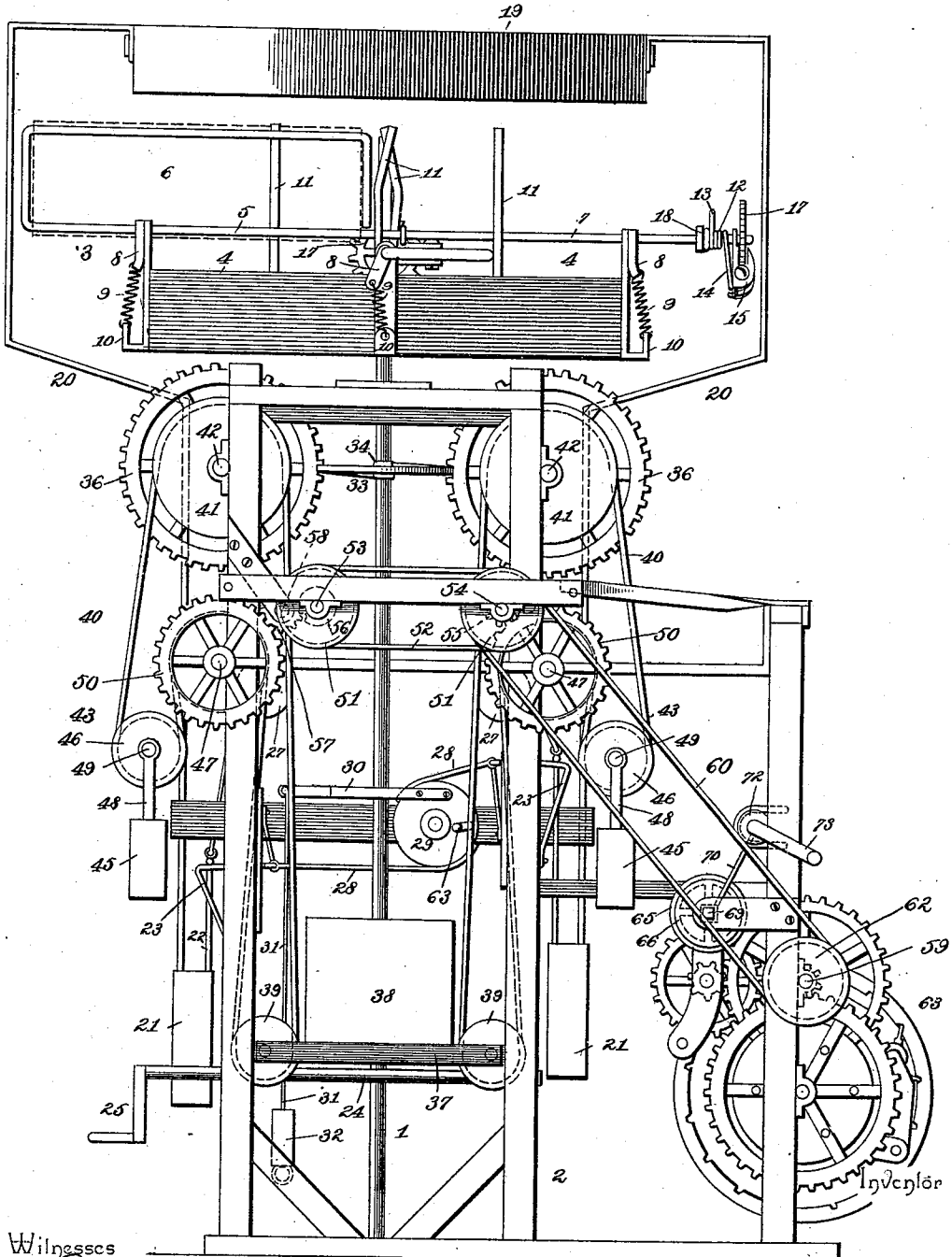
3 Sheets—Sheet 2.

G. C. PARSONS.

WIND ENGINE.

No. 549,741. Patented Nov. 12, 1895.

FIG. 2.



Witnesses

E. H. Monroe.

H. M. Riley

By his Attorneys,

George C. Parsons.

C. A. Snow & Co.

(Model.) 3 Sheets—Sheet 3.

G. C. PARSONS.

WIND ENGINE.

No. 549,741. Patented Nov. 12, 1895.

Fig. 3.

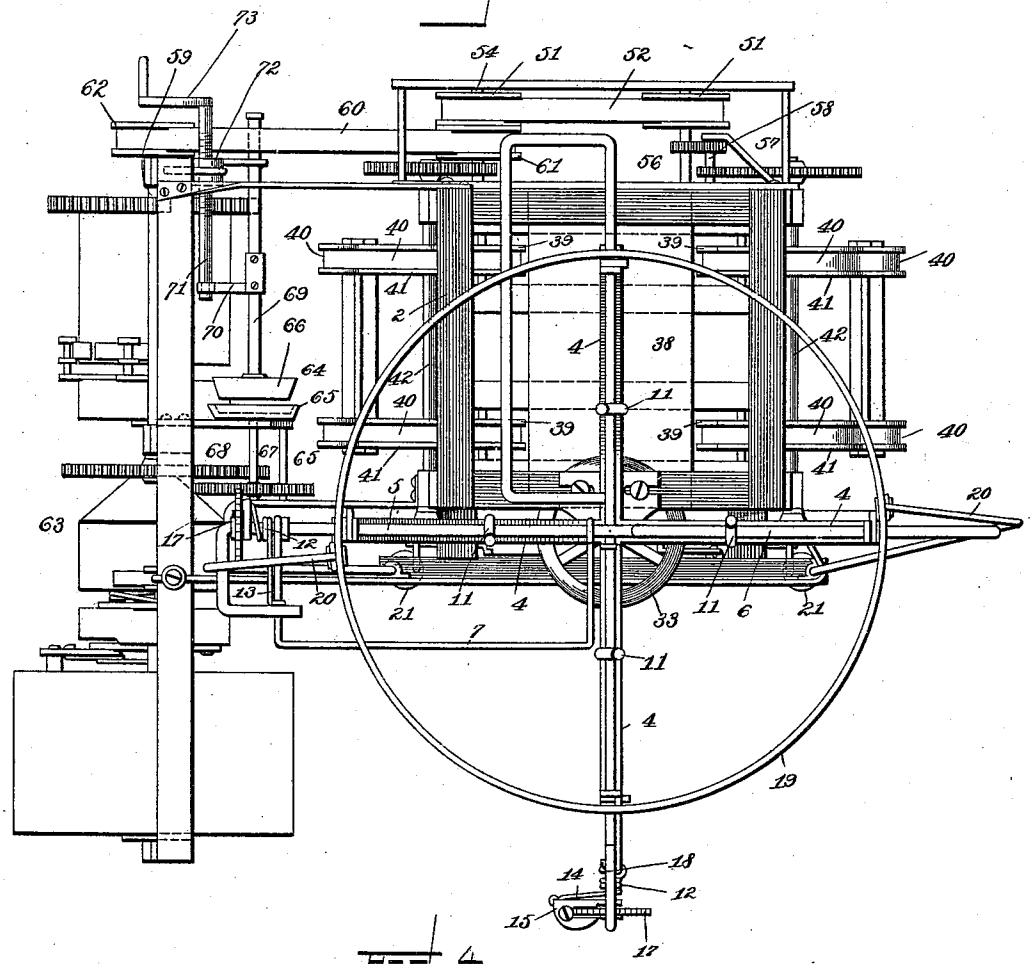
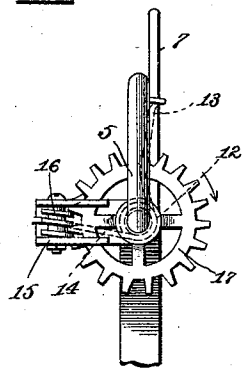


Fig. 4.



Witnesses
C. H. Mouner.
J. F. Tilney

Inventor
George C. Parsons

By his Attorneys.
C. A. Snow & Co.

UNITED STATES PATENT OFFICE.

GEORGE C. PARSONS, OF TOPEKA, KANSAS.

WIND-ENGINE.

SPECIFICATION forming part of Letters Patent No. 549,741, dated November 12, 1895.

Application filed October 22, 1892. Serial No. 449,731. (Model.)

To all whom it may concern:

Be it known that I, GEORGE C. PARSONS, a citizen of the United States, residing at Topeka, in the county of Shawnee and State of Kansas, have invented a new and useful Wind-Engine, of which the following is a specification.

The invention relates to improvements in windmills.

The object of the present invention is to improve the construction of windmills and to provide one capable of affording a continuous and steady supply of power and adapted for running various kinds of machinery.

A further object of the invention is to enable the expenditure of the power to be readily regulated and adapted for the particular character of machinery to be run.

The invention consists in the construction and novel combination and arrangement of parts hereinafter fully described, illustrated in the accompanying drawings, and pointed out in the claims hereto appended.

In the drawings, Figure 1 is a front elevation of a windmill constructed in accordance with this invention. Fig. 2 is a rear elevation of the same. Fig. 3 is a plan view. Fig. 4 is a detail view of a tension device for governing the feathering-blades of the wind-wheel.

Like numerals of reference indicate corresponding parts in all the figures of the drawings.

1 designates a vertical shaft of any desirable construction, journaled in suitable bearings of a main frame 2 and carrying a horizontal wind-wheel 3, which causes a rotation of the vertical shaft. The horizontal wind-wheel is provided with a supporting-frame having radial arms 4, arranged in diametrically-disposed pairs of any desired number, four being shown for convenience in the accompanying drawings. On each pair of arms 4 is journaled a horizontally-disposed rock-shaft 5, carrying blade-frames 6 and 7 and provided with depending arms 8, connected by springs 9 with brackets 10 of the arms of the supporting-frame, the brackets being preferably extended above the supporting-frame to provide bearings for the shaft 5. The blade-frames 6 and 7 are oblong or rectangular and are covered with a suitable material, as illustrated in dotted lines, to form blades. The blades are arranged at right angles to each other, whereby when one is vertical to receive the wind the other is horizontal for feathering, and the springs 9 hold the shaft 5, when there is no wind, normally in position to set all the blades at an angle of forty-five degrees to catch any wind. The supporting-frame has mounted on its arms oppositely-disposed upward-extending stops 11 to prevent the blades from swinging upward past a vertical position and to maintain them in a vertical position while receiving the wind on their front faces. As soon as the wind-wheel turns sufficiently to carry a blade out of the wind the latter will blow against the back of the blade and carry the same away from the support 11 to feather the blades, and this simultaneously brings the companion blade in operative position by swinging the same upward against its support. By this construction the blades are automatically feathered in order to prevent any resistance to the rotation of the wheel, and the blades are automatically brought into operative position.

The blade 6 is rigid with the rock-shaft, while the other companion blade 7 is hingedly connected with the rock-shaft; but the latter blade is normally held in proper relation with the rigid blade by a spring 12. The spring 12 has two angularly-disposed arms 13 and 14 and a connecting-coil forming an eye and arranged on the shaft. The arm 13 is attached to the hinged blade, and the other arm is connected to a casing 15, journaled on the shaft and carrying a worm or screw 16, which meshes with a cog-wheel 17, rigid with the shaft, whereby by rotating the worm or screw the position of the casing is changed and the tension of the spring is adjusted. The arm 13 is held normally rigid with the shaft by a stop 18, against which the hinged blade bears and which is preferably formed by an L-shaped extension of the rock-shaft.

The wind-wheel has its rotation stopped and the blades 6 and 7 are swung downward in a horizontal position to carry them out of the wind by a cylindrical brake or ring 19, arranged above the wheel and supported by rods 20 and adapted to be lowered upon the blades 6 and 7 of the rock-shafts. The blade 6 swings down by turning the rock-shaft, and

the other blade 7 swings downward on the shaft against the action of the spring 12, and as soon as the brake-ring is elevated the springs 9 and 12 return the blades to their proper normal position.

The rods 20 have their upper ends offset to clear the wind-wheel. They carry weights 21 at their lower ends to impart to the brake-ring the force necessary to depress the blades of the wind-wheel. The rods are provided at their lower ends with upward-extending L-shaped bracket-arms 22, arranged parallel with the lower portions of the rods 20 and adapted to engage shouldered spring-catches 23, mounted on the main frame 2.

The brake is elevated to release the wind-wheel by a windlass-shaft 24, journaled in suitable bearings on the frame and provided with a crank-handle 25 and having wound on it the lower ends of ropes or cords 26, which pass upward around grooved pulleys 27 and extend downward and are connected to the L-shaped arms 22 of the brake mechanism, whereby by turning the windlass-shaft 24 the weights 21, the rods 20, and the brake-ring may be elevated. After the brake-ring has been elevated clear of the wind-wheel the L-shaped bracket-arms 22 engage and are supported by the shoulders of the spring-catches 23, and by this means the brake is maintained off the wind-wheel. The upper shouldered portions of the spring-catches are preferably connected by metallic straps 28 or the like with the wheel 29, provided with an arm 30, from which depends a rope or cord 31, having a handle at its lower end and provided with a counterbalancing-weight 32 to enable the parts to be operated by a slight pull. By drawing the arm 30 downward the wheel 29 is partially rotated, thereby drawing on the straps or other flexible connections 28 and withdrawing the spring-catches, which support the brake mechanism in an elevated position, and causing an application of the brake.

The vertical shaft near its upper end carries a horizontally-disposed worm-wheel 33, consisting of a flat wheel having its periphery split and the adjacent ends 34 and 35 formed thereby separated. The lower end 35 is beveled and is adapted to engage readily between the teeth of vertically-disposed cog-wheels 36, arranged at opposite sides of the worm-wheel, whereby at each rotation of the worm-wheel the cog-wheels 36 will be rotated one tooth. By this arrangement it will be apparent that a powerful leverage is obtained and that the cog-wheels 36 are absolutely locked against independent rotation to prevent any backward or retrograde movement of the gears when there is no wind and a wind-wheel is stationary.

Within the main frame is arranged a vertically-movable platform 37, carrying a heavy weight 38 and having journaled at its four corners pulleys or wheels 39, on which are arranged endless belts, bands, cables, or sprocket-chains, which are operated by the cog-wheels 36 for winding up or raising the weight 38. A pair of endless belts or bands 40 are arranged at each end of the frame and pass over upper pulleys or wheels 41, which are mounted on horizontal shafts 42, carrying the cog-wheels 36 and receiving motion therefrom. These belts or bands 40 pass downward around the lower pulleys or wheels 39 of the weight 38, and as the latter is raised they slacken, and this slack is taken up to preserve the endless belts or bands at the proper tension by slack-loops 43, intermediate pulleys or wheels 44, and slack-loop weights 45, which are provided with pulleys or wheels 46 to facilitate taking up the slack. The intermediate pulleys or wheels 44 are mounted on shafts 47, journaled on the main shaft, and the weight 45 is provided with upward extending-arms 48, having bearings for the reception of a horizontal shaft 49, which carries the pulley or wheel 46. Each shaft 47 at the rear side of the frame has fixed to it a drive cog-wheel 50, from which motion is conveyed by intermediate gearing to a pulley 51, and a pair of pulleys 51 are employed and are connected by a horizontally-disposed belt 52, and they may be either plain or sprocket wheels, as desired. The pulleys or wheels 51 are fixed to shafts 53 and 54. The shaft 54 carries a cog-wheel or pinion 55, which meshes directly with the adjacent cog-wheel 50, and the other shaft 52 carries a pinion 56, which is connected with the adjacent cog-wheel 50 by intermediate gears 57, fixed to a shaft 58. This arrangement of gears for connecting the pulleys 51 with the cog-wheels 50 enables the proper speed to be obtained. The accumulated power is transmitted to a horizontal shaft 59 by an endless belt 60, extending from a pulley or wheel 61 of the shaft 54 to a similar pulley or wheel 62 of the horizontal shaft 59, and from the latter the power is conveyed to a system of clutches 63, not forming a part of the present application, and therefore not specifically described herein.

By the arrangement of the weight and the manner of transmitting motion therefrom a continuous uniform distribution of power is obtained, although the wind-wheel may operate at intervals only. At all times when the weight is elevated it will have the effect of continuously rotating the shafts 47 independent of the rotation of the cog-wheels 36, as the slack-loops permit such action. One portion of each endless belt or band of the weight extends from the latter to the wheels or pulleys 41, whereby the elevation of the weight is effected, and the other portion of each endless band extends from the weight to the pulley or wheel 44 to produce a distribution of the power, and the weight, when elevated, will have the same tendency to rotate the pulleys or wheels 44 whether it be a greater or less distance from the ground or whether the cog-wheels 36 be stationary or in motion. When the weight has reached its

greatest elevation, the wind-wheel is thrown out of the wind automatically to stop the further ascent of the weight, and to accomplish this the disk or wheel 29 is provided with an eccentrically-arranged pin 63, adapted to be engaged by the weight or the platform supporting the same to rotate the wheel or disk 29 partially to wind up the strap or connections 28 to withdraw the spring-catches from beneath the arms 22 of the brake-ring rods 20 to cause the brake to depress the blades 6 and 7 of the horizontal wind-wheel into a horizontal position to stop the rotation of the wind-wheel. The wind-wheel may be stopped either automatically or by hand from the ground, as before described.

The distribution of the accumulated power is controlled by a friction device 64, consisting, essentially, of a friction disk or wheel 65, connected by gearing with the horizontal shaft 69, and a friction-block 66, and means for carrying the latter into and out of engagement with the disk or wheel 65 and for regulating such engagement to retard to a greater or less extent the descent of the weight and the consequent expenditure of power. The friction disk or wheel 65 is mounted on a shaft 67, which is connected by a train of gears 68 with the horizontal shaft 69 to increase the power of the friction wheel or disk 65 in its retarding action when engaged by the block 66. The block 66 is annular or frusto-conical and is adapted to fit into the annular disk or wheel 65, which is slightly cup-shaped, and the said friction-block 66 is mounted on the end of a horizontal rod 69. The rod 69 is slidingly mounted on the supporting or main frame and is provided with an arm 70, which is swiveled to the inner end of a horizontally-disposed screw 71, and the latter passes through a nut 72. The nut 72 is fixed to the frame of the apparatus, and the adjusting-screw 71 terminates in or is provided with a crank-handle 73. By rotating the adjusting-screw 71 the sliding rod 69 may be moved inward or outward to engage or disengage the brake-block or friction-producing block 66 from the disk or wheel 65. By this construction the expenditure of the accumulating power is readily controlled.

It will be seen that the apparatus is adapted to furnish a continual and uniform supply of power and that the uniform expenditure or distribution of the same is not affected by variations in the wind.

Changes in the form, proportion, and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention, such as adapting the apparatus to the character of work to be performed or the machinery to be run and to the amount of power required and its duration.

What I claim is—

1. In an apparatus of the class described, the combination of a vertical shaft, a wind wheel for actuating the same, a worm carried by the shaft, a vertically disposed gear wheel meshing with the worm, a weight, an endless belt provided with a slack loop and connected with the weight and with the gear wheel, and gearing for transmitting motion from the weight and operated by the same, substantially as described.

2. In an apparatus of the class described, the combination of a vertical shaft, a wind wheel for rotating the shaft, a horizontal shaft, gearing connecting the vertical shaft and the horizontal shaft, a weight, an endless belt provided with a slack loop and connected with the weight and with the horizontal shaft, and gearing for transmitting motion from and operated by the weight, substantially as described.

3. In an apparatus of the class described, the combination of a vertical shaft provided with a worm, a wind wheel for rotating the shaft, the opposite horizontal shafts, vertical gear wheels mounted on the horizontal shafts and disposed at opposite sides of and meshing with the worm, a weight provided with pulleys, pulleys arranged on the horizontal shafts, pulleys 44 located below the pulleys of the horizontal shaft, an endless belt passing around the pulleys of the weight and having one portion passing over the pulleys of the horizontal shaft, and the opposite portion passing over the pulleys 44, said belt being provided with slack loops, substantially as described.

4. In an apparatus of the class described, the combination with a vertical shaft provided with a worm, a wind wheel for rotating the shaft, the opposite gear wheels meshing with the worm, a weight, the endless belt provided with slack loops and connected with the weight and the gear wheels, and gearing for transmitting motion from and operated by the weight, substantially as described.

5. In an apparatus of the class described, the combination of a vertical shaft having a worm, opposite gear wheels meshing with the worm, a weight provided with pulleys 39, the pulleys 41 connected with the gear wheels, pulleys 44 located below the pulleys 41, endless bands passing around the pulleys of the weight and extending upward therefrom and having one portion passing over the pulleys 41 and the opposite portion passing over the pulleys 44, said bands forming slack loops, and a tension device connected with the slack loops, substantially as described.

6. In an apparatus of the class described, the combination of a vertical shaft having a worm, opposite gear wheels meshing with the worm, a weight provided with pulleys 39, the pulleys 41 connected with the gear wheels, pulleys 44 located below the pulleys 41, endless bands passing around the pulleys of the weight and extending upward therefrom and having one portion passing over the pulleys 41 and the opposite portion passing over the pulleys 44, said bands forming slack loops, and weights provided with pulleys engaging

the slack loops, substantially as and for the purpose described.

7. In an apparatus of the class described, the combination of a supporting frame, a vertical shaft journaled thereon and provided with a worm, a weight mounted in and guided by the supporting frame and provided with pulleys 39, the shafts 42 disposed horizontally and carrying pulleys 41, and provided with gear wheels meshing with said worm, the shafts 47 located below the shafts 42, and carrying pulleys 44, the endless belts passing around the pulleys 39 of the weight and over the pulleys 41 and 44, and forming slack loops, tension devices connected with the slack loops, and gearing for connecting the shafts 47 and for transmitting motion therefrom, substantially as described.

8. In an apparatus of the class described, the combination of a frame, a vertical shaft journaled therein and provided with a worm, gear wheels meshing with the worm a vertically movable weight connected with and elevated by the gear wheels, a wind wheel connected with the vertical shaft and having hinged blades, a brake located above the wind wheel and adapted when lowered to depress the blades, and means for automatically operating the brake when the weight has reached the limit of its upward movement, substantially as described.

9. In an apparatus of the class described, the combination of a frame, a vertical shaft journaled thereon and provided with a worm, a horizontal wind wheel connected with the shaft and having hinged blades, a vertically movable weight, gear wheels meshing with the worm and connected with and adapted to elevate the weight, a brake located above the wind wheel and adapted to depress the blades thereof, and provided with depending rods, catches for supporting the rods for holding the brake elevated above the wind wheel, and means for automatically withdrawing the catches from the rods when the weight has reached the limit of its upward movement, substantially as and for the purpose described.

10. In an apparatus of the class described, the combination of a frame, a vertical shaft journaled thereon and provided with a worm, a horizontal wind wheel connected with the shaft and having hinged blades, a vertically movable weight, gear wheels meshing with the worm and connected with and adapted to elevate the weight, a brake located above the wind wheel and adapted to depress the blades thereof, and provided with depending rods, catches for supporting the rods for holding the brake elevated out of engagement with the wind wheel, a wheel or disk journaled on the frame and provided with an eccentrically arranged pin adapted to be engaged by the weight to rotate partially the wheel or disk, and flexible connections extending from the catches to the wheel or disk and arranged to be wound thereon, whereby the catches will be withdrawn from engagement with the rods when the weight engages the eccentrically arranged pin, substantially as described.

11. In an apparatus of the class described, the combination of a frame, a horizontally disposed wind wheel having hinged blades, a brake located above the wind wheel, and arranged to depress the blades thereof, rods depending from and supporting the brake, and provided with arms, catches mounted on the frame and arranged to receive the arms of the rods for supporting the brake, a disk or wheel having an eccentrically arranged pin, flexible connections extending from the catches to the disk or wheel and arranged to be wound thereon, and a vertically movable weight operated by the wind wheel, and adapted to engage the eccentrically arranged pin, substantially as and for the purpose described.

12. In an apparatus of the class described, the combination of a frame, a horizontally disposed wind wheel having hinged blades, a brake located above and adapted to depress the blades of the wind wheel, rods depending from the brake and provided with arms, catches supporting the rods and receiving the arms thereof, a disk provided with an arm, flexible connections extending from the catches to the disk and adapted to be wound thereon, and an operating rope connected with the arm of the disk, substantially as described.

13. In an apparatus of the class described, the combination of a frame, a horizontal wind wheel, a brake located above the wind wheel and adapted to depress the blades thereof, rods depending from the brake, a windlass connected with the rods and adapted to elevate the brake, catches for supporting the rods, and means for tripping the catches, substantially as described.

14. In an apparatus of the class described, the combination of a frame, a horizontally disposed wind-wheel having hinged spring actuated blades, a brake ring located above and adapted to depress the blades, rods depending from the brake ring and provided with arms, and having counterbalancing weights, catches for supporting the rods and adapted to receive the arms thereof, a windlass for elevating the rods, and means for tripping the catches, substantially as described.

15. In an apparatus of the class described, the combination of a frame, a vertical shaft journaled thereon and provided with a worm, a wind wheel for rotating the shaft, a pair of vertically disposed gear wheels located at opposite sides of the worm and meshing with the same, a vertically movable weight connected with and operated by the gear wheels, gearing for transmitting motion from and operated by the weight, a train of gears connected with said gearing and provided with a friction disk, a block arranged to engage the friction disk for retarding the descent of

the weight, and means for operating the block, substantially as described.

16. In an apparatus of the class described, the combination of a frame, a vertical shaft journaled therein and provided with a worm, a wind wheel for rotating the shaft, a pair of vertically disposed gear wheels located at opposite sides of the worm and meshing with the same, a vertically movable weight connected with and operated by the gear wheels, gearing for transmitting motion from and operated by the weight, a train of gears connected with said gearing and provided with a friction disk, a sliding rod having an arm, a friction block mounted on the sliding rod and arranged to engage the disk, and an adjusting screw swiveled to the arm of the sliding rod and adapted to actuate the latter, substantially as described.

17. In an apparatus of the class described, the combination of a frame, a horizontal wind wheel comprising radially disposed rock-shafts having rigid blades and journaled in suitable bearings, hinged blades mounted on the rock-shafts, springs connected with and holding the rock-shafts in operative position, and tension devices mounted on the rock-shafts and connected with the hinged blades, substantially as described.

18. In an apparatus of the class described, the combination of a supporting frame, a vertical shaft journaled thereon, a wind wheel frame mounted on the shaft, and having radial arms and provided with bearings, rock-shafts journaled in said bearings and provided with rigid blades, stops mounted on the wind wheel frame and arranged to be engaged by said blades to limit the swing of the rock-shafts, hinged blades mounted on the rock-shafts, and tension devices carried by the rock-shafts and connected with the hinged blades, substantially as described.

19. In an apparatus of the class described, the combination of a main frame, a vertical shaft journaled thereon, a wind wheel supporting frame carried by the vertical shaft and provided with suitable bearings, rock-shafts journaled in said bearings and provided at one end with rigid blades, and at the opposite end with stops, hinged blades mounted on the latter ends of the rock-shafts and supported by the stops thereof, gear wheels fixed to the rock-shafts and located adjacent to the stops, a casing journaled on the rock-shafts and provided with a screw or worm meshing with the gear-wheels, and springs disposed on the rock-shafts and connected with the hinged blades and with said casings, substantially as described.

20. In an apparatus of the class described, the combination of a main frame, a vertical shaft journaled thereon, a wind wheel supporting frame carried by the vertical shaft and provided with bearings, rock-shafts journaled in the bearings and having depending arms, springs mounted on the supporting frame and connected with the arms of the rock-shafts, blades located at one end of the rock-shafts and rigidly connected therewith, stops located at the other end of the rock-shafts, hinged blades mounted on the rock-shafts and located adjacent to the stops, springs mounted on the rock-shafts and connected with the hinged blades, devices for regulating the tension of the springs of the hinged blades, and stops mounted on the supporting frame and arranged to limit the swing of the blades, whereby the latter are held in a vertical position, substantially as described.

GEO. C. PARSONS.

Witnesses:
J. C. CARROLL,
L. M. MCGILVRA.