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WINDMILL BRAKE.

(Application filed Jan. 18, 1899.)

(No Model.)

Fig. 1.

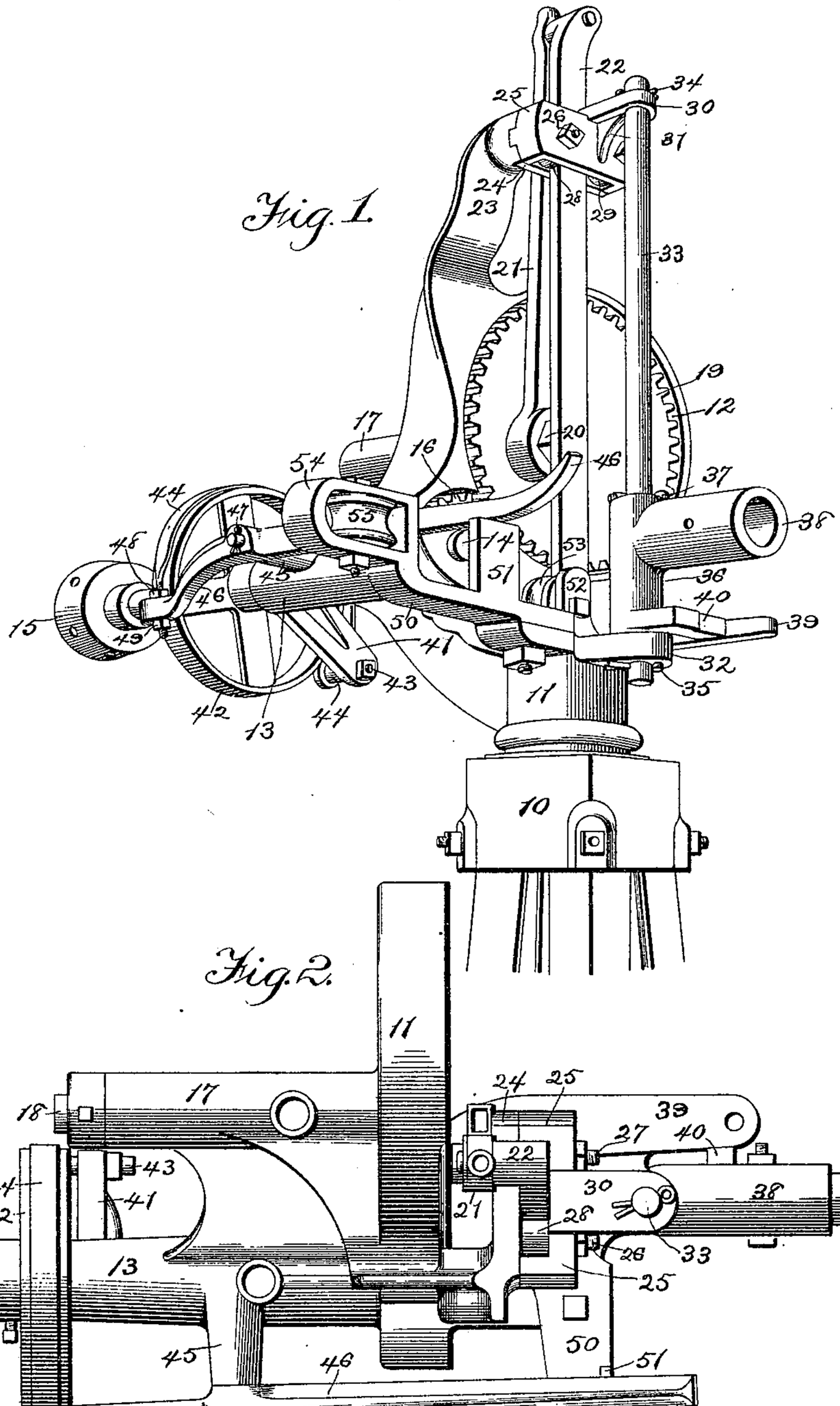

Fig. 2.

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WINDMILL-BRAKE.

SPECIFICATION forming part of Letters Patent No. 637,326, dated November 21, 1899.

Application filed January 18, 1899. Serial No. 702,600. (No model.)

To all whom it may concern:

Be it known that we, ALEXANDER R. DEMPSTER and WILLIAM D. RINEHART, citizens of the United States of America, and residents of Des Moines, in the county of Polk and State of Iowa, have invented certain new and useful Improvements in Windmill-Brakes, of which the following is a specification.

The object of this invention is to provide an improved construction for windmill-heads and to adapt thereto a brake for the wind-wheel so arranged and mounted as that in the throwing of the windmill out of gear the brake will be effectively applied to stop the rotation of the wind-wheel.

A further object of this invention is to provide means so arranged as that when the windmill is again thrown into gear the brake is released to permit the rotation of the wind-wheel.

Our invention consists in the construction, arrangement, and combination of elements hereinafter set forth, pointed out in our claims, and illustrated by the accompanying drawings, in which—

Figure 1 is a perspective of the windmill-head, showing the brake applied thereto, the wind-wheel, vane, and chain controlling the vane being removed. Fig. 2 is a plan of the mechanism shown in perspective in Fig. 1.

In the construction of the machine as shown the numeral 10 designates the upper end portion or cap-piece of a tower, and 11 a head-casting mounted on and extending upwardly from the cap-piece and stepped for rotation therein on a vertical axis. The head-casting 11 is formed with a recess or cavity 12 in one face and a bearing portion 13, projecting horizontally from the face opposite the cavity, the bearing portion 13 being bored its entire length and communicating with the said cavity. A wind-wheel shaft 14 is mounted horizontally for rotation in the bore of the bearing portion 13 and projects therefrom at both of its ends. One end of the wind-wheel shaft 14 is provided with a hub 15, whereby a wind-wheel (not shown) may be attached to said shaft, and a driving-gear 16 is mounted rigidly, yet removably, on the end of the shaft opposite the hub and within the cavity 12. A bearing portion 17 is formed on the head-casting 11, parallel with and above and to one side of the bearing portion 13, and is bored horizontally from end to end and communicates with the cavity 12. A counter-shaft 18 is mounted for rotation in the bearing portion 17 and projects into the cavity 12, and a wrist-wheel 19 is mounted on the end portion of the counter-shaft rigidly, yet removably, within the cavity and is toothed for engagement by the driving-gear 16. A wrist-pin 20, seated in the wrist-wheel 19, forms a pivotal connection between said wheel and the lower end of a pitman 21. The pitman 21 extends vertically from the wrist-pin 20 and is pivotally connected at its upper end to the upper end portion of a connecting-rod 22. The rod 22 is vertically positioned and extends downwardly from its point of attachment with the pitman through a vertical aperture in the lower portion of the head-casting 11 and thence to a point of attachment to a pump or other mechanism to be driven. (Not shown.) An arm 23 is formed on and extends upwardly from the head-casting 11, and at the extremity of said arm is formed a horizontally-positioned lateral arm 24. A bearing-block 25 is mounted parallel and in contact with the lateral arm 24 and is secured thereto by bolts 26 27. A large aperture or cavity is formed in the bearing-block 25, vertically therethrough, and antifriction-rollers 28 29 are mounted loosely on the body portions of the bolts 26 27 within the aperture and spaced apart. The connecting-rod 22 traverses the space between the antifriction-rollers 28 29 and is guided thereby in vertical reciprocation in the operation of the windmill, as hereinafter described.

An ear 30 is formed on and projects horizontally from the outer face of the bearing-block 25, and a web or brace 31 is cast below the ear and integrally with the block to strengthen it. An ear 32 is formed on and projects outwardly from the head-casting 11 in the vertical plane of the ear 30, and both of said ears are apertured vertically. A pin 33 is vertically positioned in the apertures of the ears 30 and 32 and is held by split keys 34 35, traversing the pin above and below the ears, respectively. The pin 33 is free to ro-

tate in the apertures of the ears. A collar 36 is mounted loosely on the lower portion of the pin 33 and rests on the upper face of the ear 32. The collar 36 is retained against vertical movement along the pin 33 by a split key 37, traversing the pin immediately above the collar. A vane-socket 38 is formed on and projects laterally from the upper portion of the collar 36, in which socket a windmill-vane (not shown) may be mounted. An arm 39 is formed on and projects laterally from the lower portion of the head-casting 11 approximately parallel with but to a greater length than the ear 32, and an angle-arm 40, formed on and projecting from the collar 36 below the vane-socket 38, engages at times with the arm 39 and limits and determines the movement of the collar in one direction revolubly of the pin 33. An arm 41 is formed on and extends obliquely downwardly from the outer end portion of the bearing portion 13, and a friction-wheel 42 is mounted rigidly, yet removably, on the shaft 14, adjacent the extremity of said bearing portion. A bolt 43 is seated in the extremity of the arm 41 and projects across the face of the friction-wheel 42. A metallic brake-strap 44 is provided, and one end thereof is wrapped around the bolt 43, the body portion of said strap being curved and traversing the periphery of and above the wheel 42. The length of the brake-strap is such that when positioned for use, as illustrated, it will cover and extend along approximately one-half of the periphery of the friction-wheel. A stud 45 is formed on and extends horizontally laterally from the central portion of the bearing portion 13, and the extremity of said stud is reduced. A brake-lever 46 is fulcrumed intermediate of its ends on the reduced portion of the stud 45 and is retained thereon by a split key 47, traversing the extremity of the stud. The end portion of the brake-strap 44, opposite the bolt 43, is formed circular in cross-section and screw-threaded and traverses an aperture in the adjacent extremity of the lever 46, nuts 48 49 being mounted thereon above and below the lever, respectively, to secure said strap to the lever. A bracket 50 is bolted to and projects horizontally from the head-casting radially of the axis of rotation of said casting, and a stud 51 is formed on and rises from said bracket beneath the free end portion of the brake-lever 46. The free extremity of the brake-lever 46 is curved upwardly and projects beyond the stud 51 a considerable distance. Ears 52, one only of which is shown in Fig. 1, are formed on and rise from the inner end of the bracket 50, and a sheave 53 is mounted for revolution between said ears. The inner end portion of the bracket 50 is apertured for the passage of the connecting-rod 22, adjacent the sheave 53, and space is provided in said aperture for the passage of a chain, hereinafter mentioned. A yoke 54 is formed on the extremity of the bracket 50, and a sheave 55 is mounted therein for revolution on a vertical axis.

A chain (not shown) may be attached to the windmill-vane, run through the sheave 55, over the sheave 53, and downward between the latter sheave and the connecting-rod to a point of attachment to a regulator or other device whereby the vane may be swung out of the wind by draft on the chain as required to throw the windmill out of gear. When the windmill is thrown out of gear, the vane-socket swings around and beneath the upwardly-curved end portion of the brake-lever 46 and contacts with the bracket 50. In its engagement with the brake-lever the vane-socket raises the outer end thereof and consequently lowers the opposite end thereof, causing the lever to apply a strain to the strap 44 and impinge said strap upon the friction-wheel to such degree of tension and friction as to stop the movement of rotation of the friction-wheel, its shaft, and the wind-wheel. The vane-socket retains the lever in such position as to insure a constant frictional engagement between the brake-strap and friction-wheel sufficient to rigidly retain the wind-wheel against rotation until such time as the vane is released. When the vane is released, it will swing, under the influence of air-currents, away from the lever 46 to a point where it is stopped by engagement of the angle-arm 40 with the arm 39 of the head-casting, and thereafter, until again operated by the chain, will hold the wind-wheel in the wind. When the vane-socket swings away from the bracket 50, the lever 46 repositions automatically, by reason of the weight of the free end of the lever and the expansive resilience of the brake-strap, into the relative position shown, relieving and withholding the frictional contact between the strap and friction-wheel. When the brake is released, the wind-wheel rotates the shaft 14 and driving-gear 16. The driving-gear 16 meshes with and drives the wrist-wheel 19, and said wrist-wheel operates the pitman, and through the pitman reciprocates the connecting-rod, whereby mechanism may be operated. By reason of the recess or cavity 12 in the head-casting the gear-wheels may be located in a semiprotected position, where they are, in the lee of the casting, less subject to the action of unfavorable climatic conditions and less liable to impediment by snow and ice accumulation.

We claim as our invention—

1. The combination of the head, the bearing portion thereon, the shaft mounted for rotation in said bearing portion and provided with means for mounting a wind-wheel, the friction-wheel on said shaft, the arm 41 on the head, the strap attached thereto at one end and extended over a portion of the periphery of the friction-wheel, the stud 45 on the head, the brake-lever fulcrumed intermediate of its ends on said stud, which lever

is connected at one end to one end of the strap, the bracket on the head, the stud on the bracket supporting, at times, the free end of the brake-lever, the vertical pin 33 on the head, the vane-socket pivoted on said pin, means for limiting the swing of the vane-socket in one direction, and sheaves on the head to receive and support a chain whereby the vane-socket may be swung into contact with the brake-lever to oscillate said lever to the operation of the brake-strap on the friction-wheel.

2. The head-casting having the ears 30, 32 formed on or attached thereto and apertured in vertical alinement, the pin mounted in the ears, the vane-socket on the pin, the stop-arm on the head-casting, the angle-arm on the socket arranged to engage the stop-arm, the bracket on the head-casting, the brake-lever crossing the bracket and intersecting the orbit of the vane-socket, the yoke on the bracket, the sheave in the yoke, the sheave on the inner end of the bracket, said sheaves being arranged to receive and support a vane-operating chain, and a stud on the bracket arranged to limit the movement of oscillation of the brake-lever.

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