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VICTORIA.

Date of Patent, 188

No.

Letters Patent

FOR

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VICTORIA.

No. 4549

Letters Patent.

Victoria by the Grace of God of the United Kingdom of GREAT BRITAIN and IRELAND QUEEN Defender of the Faith to all to whom these presents shall come GREETING:

Whereas James Frederick Kilburn residing at 23 Williams Road Prahran near Melbourne in the Colony of Victoria Engineer hath represented that he is desirous of obtaining our ROYAL LETTERS PATENT for securing unto him our special licence that he his executors administrators and assigns and such others as he or they should agree with and no others should and lawfully might make use exercise and vend within our Colony of Victoria and its dependencies an Invention for "Improvements in the Manufacture of Windmills to be entitled "The Kilburn Windmill"

And We being willing to give encouragement to all arts and inventions which may be for the public good are graciously pleased to confer upon the said James Frederick Kilburn his executors administrators and assigns sole privilege and authority that he the said James Frederick Kilburn his executors administrators and assigns and no others during the term herein expressed shall and lawfully may make use exercise and vend his said Invention within our said Colony and its dependencies To have hold exercise and enjoy the said privileges and advantages unto and by the said James Frederick Kilburn his executors administrators and assigns for and during and unto the full end and term of fourteen years now next ensuing.

Provided always and these our Letters Patent are and shall be upon this condition that if at any time during the said term hereby granted it shall appear that this our grant is contrary to law or prejudicial or inconvenient to our subjects in general or that the said Invention is not a new Invention as to the public use and exercise thereof or that the said James Frederick Kilburn is not the true and first inventor thereof within this Colony or its dependencies these our Letters Patent shall forthwith cease determine and be utterly void to all intents and purposes anything hereinbefore contained to the contrary thereof in anywise notwithstanding Provided likewise nevertheless and these our Letters Patent are upon this express condition that if the said instrument in writing does not particularly describe and ascertain the nature of the said Invention and in what manner the same is to be performed and also if the said James Frederick Kilburn his executors administrators or assigns shall not pay at the Patent Office of our said Colony the sum of Two pounds ten shillings within three years next after the date of these presents and the sum of Two pounds ten shillings within seven years next after such date that then and in any of the said cases these our Letters Patent and all liberties and advantages whatsoever hereby granted shall utterly cease determine and become void anything hereinbefore contained to the contrary thereof in anywise notwithstanding Provided that nothing herein contained shall prevent the granting of licences in such manner and for such considerations as they may by law be granted And lastly we do by these presents for us our heirs and successors grant unto the said James Frederick Kilburn his executors administrators and assigns that these our Letters Patent shall be in and by all things good firm valid and sufficient and effectual in the law according to the true intent and meaning thereof and shall be taken construed and adjudged in the most favorable and beneficial sense for the best advantage of the said James Frederick Kilburn. his executors administrators and assigns In witness whereof we have caused these our Letters to be made patent and to be sealed and bear date as of the Twenty Ninth day of May One thousand eight hundred and eighty Six

L.S.

PATENT OFFICE · MELBOURNE, VICTORIA ·

(Signed) Henry B. Loch
Governor of Victoria.

This is a true copy
John Smith
Clerk of Patents
Melbourne 14th May 1887

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Kilburn's Patent

Fig: 11

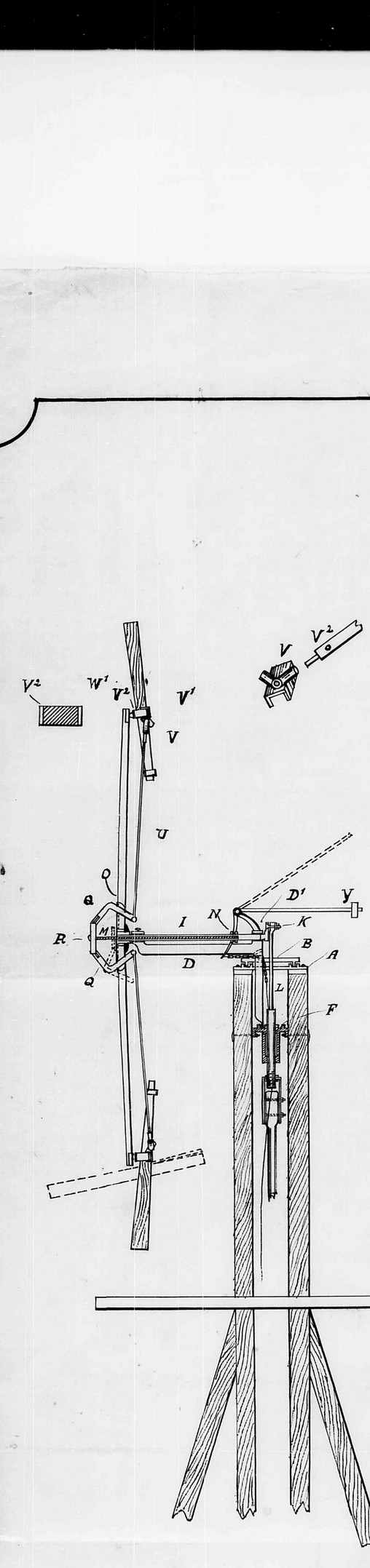


Fig: 1



Fig: 10



Fig: 12

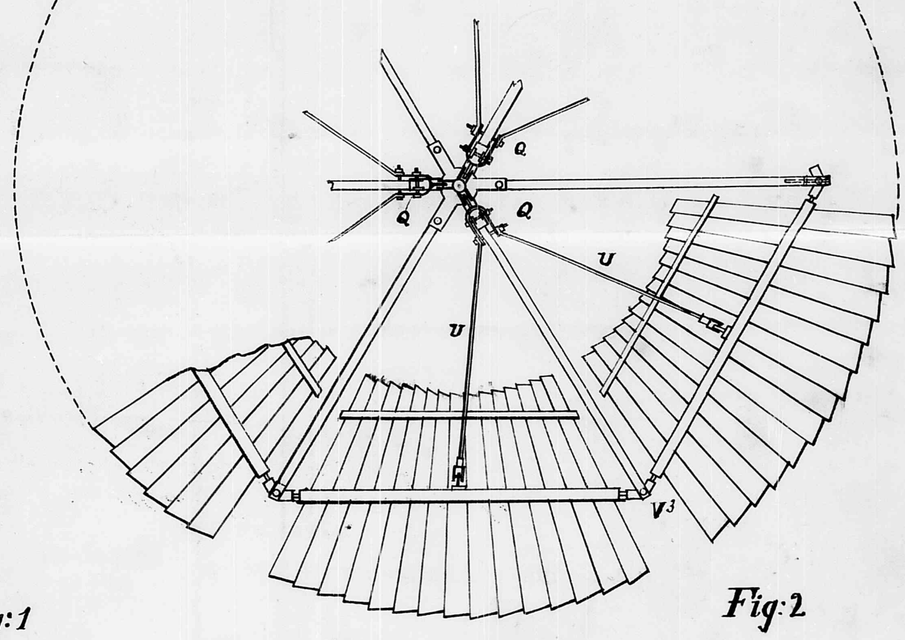


Fig: 2

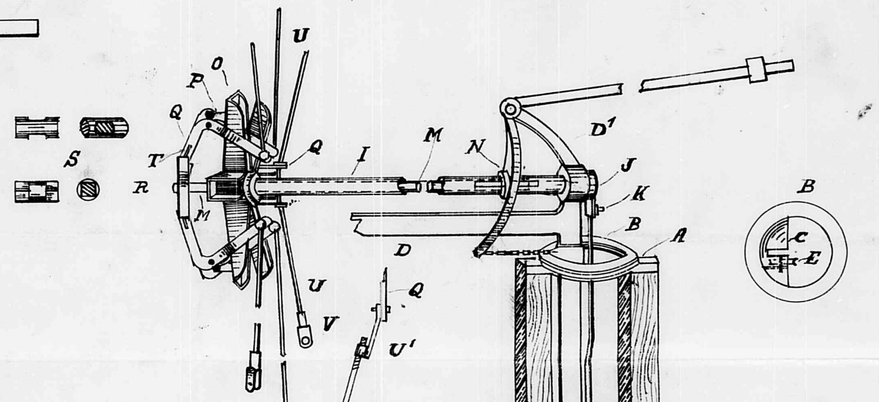


Fig: 3

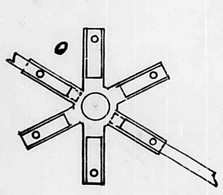


Fig: 8

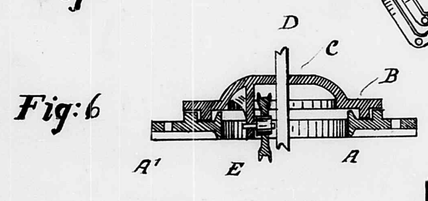


Fig: 6

Fig: 7

I allow these drawings to be deposited as part of the amended Specification of this invention

Signed

H. J. Wrixon

Attorney General

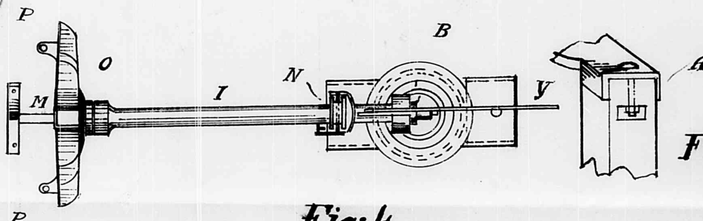


Fig: 4



Fig: 5

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To all to whom these Presents shall come.

I James Frederick Kilburn residing at 33 Williams Road Prahran near Melbourne in the Colony of Victoria. Engineer. Send Greeting whereas I am desirous of obtaining Royal Letters Patent for securing unto me Her Majesty's special license that I my executors, administrators and assigns and such others as I or they should at any time agree with and no others should and lawfully might from time to time and at all times during the term of fourteen years to be computed from the day on which the original instrument was left at the Patent Office Melbourne namely, the twenty ninth day of May One Thousand Eight Hundred and Eighty Six, make, use, exercise and vend within the Colony of Victoria and its dependencies an invention for

"Improvements in the manufacture of Windmills" to be entitled "The Kilburn Windmill"

and in order to obtain the said Letters Patent I must by an instrument in writing under my hand and seal particularly describe and ascertain the nature of the said invention, and in what manner the same is to be performed and must also enter into the covenant hereinafter contained. Now know ye that the nature of the said invention and the manner in which the same is to be performed is particularly described and ascertained in and by the following Statement. that

(1)

that is to say. My invention relates to an improved method of constructing vaneless Windmills having oscillating sail sections and has been designed for the purpose of economising labour and cost increasing their efficiency and durability, and consists in the reduction and simplification of parts, which are accurately proportioned, and so arranged that friction is reduced to a minimum, thereby rendering the Mill extremely sensitive in action, and materially lessening the possibility of breakage or derangement. Referring to the accompanying drawings the mode of construction is as follows:-

Fig: 1 illustrates a sectional view of the combination, shewing the sail sections or fans spread full; the front view of which is at Fig: 2.

The bottoms of the Standards supporting the Mill are anchored and braced in the usual manner, with an upper platform suitably arranged. The Bed Plate **A** is a metallic casting, resting upon, and bolted firmly to the top ends of the masts. The end sides of said Bed Plate are flanged for the purpose of keeping it in position, as at **A'** Fig: 5, and there is also a circular web on the under side for the same purpose. The top face of the Bed Plate has a Collar, in which an annular groove is formed to receive the projecting Ring on the Turntable hereinafter mentioned, and serving also as an oil reservoir to ensure perfect lubrication as at Figs 1 and 6.

The Turntable **B** has a projecting Ring as aforesaid upon its under side, which revolves in the said annular groove, the upper surface

surface has a convexed Breast Piece C with a central gullet to receive the L shaped Arm D, and also a lug upon its under surface to support the Steam Pulley E, both of which are hereinafter described.

The Footstep F shewn at Figs. 1, 3 and 7, has an annular groove formed upon its upper surface, in which the segmental Foot G of the Arm or Bracket D (hereinafter described) revolves, and serving also as a reservoir for oil, thus ensuring perfect lubrication. A tubular extension or guide is formed upon the under side of said Footstep F, in order to provide a long slide for the Pitman Pipe H hereinafter described.

The metallic L shaped Arm or Bracket D is provided with a segmental Foot G as at Fig: 3, also with two Bearings to receive the hollow Shaft I hereinafter described, and the Horn or extension D'. The said Bearings may be formed either solid as at Figs. 1 and 3, or with separate Caps; or top bushes having oil recesses formed in them as at Fig: 12; the Cap I° for the Crank Bearing being secured in position by means of a Cotter I', the other Bearing may have a flanged top Bush or Cap I², which may be placed loosely in its position, serving as a Covering and Lubricator for the Bearing.

The hollow Shaft I shewn at Figs. 1 and 3, revolves within the Bearings of the said Arm or Bracket, and has a Crank or Throw J forged solid or cast upon one end; said Crank is provided with one or more taper holes to receive the Crank Pin K, the head of which is slightly tapered and driven into the Crank from the back, thus

thus enabling said Pin H to be firmly secured (without the use of nuts or Cotters) when the Pitman Rod L, Washer and Split Pin are in position as shewn at Figs 1 and 3. The said Shaft I has two longitudinal slots, through which passes a Pin connecting the inner sliding Tube or Rod M to the grooved Collar N, both working freely in their respective positions.

The metallic Hub or Spider O is affixed on the outer end of the said hollow Shaft I, and differs in construction from all previous similar inventions, inasmuch as the inner side of each Arm Box has a continuation of metal or flange from the periphery of the central boss as at Fig: 8, thus forming a complete socket, into which the Arms or Spokes of the Windwheel are inserted, thereby enabling each Arm to be firmly secured by one bolt only, instead of two or more as heretofore used. The Brackets or Cheeks P are cast or affixed to each alternate Arm Box of the said Spider O, to serve as fulcrums for the Bell Cranks hereinafter described.

Fig: 3 shews a perspective view of the mechanism for reefing the sails, and consists primarily of a metallic Head R cast or affixed to the end of the sliding Rod M, the Pins S, flattened in the middle or at both ends.

The Bell Crank Q, which are fulcrumed at the elbows to the said Brackets P may have slotted ends or jaws T to engage with the said metallic Head. I do not confine myself to this exact form of connection, as the Cheeks or Arms of said metallic Head may be formed with slots for the aforesaid Pins S to

to slide in, in place of slots T in Bell Crank ends; the said Bell Cranks are so constructed as to engage two Regulating or Radial Rods U, so that each Crank works two sail sections, the said Regulating or Radial Rods U have an eye at the inner end, the outer ends being screwed to fit the Shackles V which are tapped to receive the said screwed ends as at Fig^s 2 and 3, for the purpose of adjusting the sail sections to the proper angle, and setting them true with each other.

By this method of adjustment the use of separate nuts or set screws is dispensed with, and when the sail sections are properly set it is impossible for them to work loose. The said Shackles V are connected by a Pin to the flanged Levers V' which are bolted to front side of the outer section Bar as illustrated at Fig^s 1, 2 and 10.

As an alternative arrangement an eye may be formed upon the outer end of each Regulating Rod to engage with the flanged Levers V', the inner ends of said Rods being screwed to fit the tapped Links or Shackles V', which engage with the ends of the Bell Cranks Q as at Fig: 3.

The sail sections are supported or hinged upon the flat Bars V^2 (as at Fig^s 1 and 2) bolted to the back side of the outer section Bars, materially strengthening the sail sections, reducing friction, and avoiding the complication of parts.

By this combination I dispense with the use of weighted section Levers, section Bar Castings Loose axle Rods and Nuts.

Fig: 11 illustrates the Arm Brackets V^3 abovementioned, which are bolted to the outer

outer ends of the Arms or Spokes, and are formed with bosses or sockets to receive the reduced ends of the said flat Bars V^2, and have flanges at each side as shewn at V^3 Fig: 11, in order to clasp the sides of the Arm or Spoke, and rendering only one bolt necessary to firmly secure each Arm Bracket in position, instead of two or more bolts as hitherto used. I do not confine myself to the last mentioned form, as a central web or rib may be used instead of the said flanges and fitted into a suitable recess formed in each Arm or Spoke.

W Fig: 11 shews another form of Arm Bracket designed for the purpose of taking up the wear of the reduced ends of the Bars V^2 and consists of an Arm Bracket with bosses or sockets similar to the Arm Brackets V^3, but in lieu of the flanges or rib it is provided with the sleeve W^2, to slide upon the ends of the arms or spokes of the Windmill; an adjusting Screw X^1 is passed through a hole or eye midway between the two bosses or sockets thereon, and engages with a flanged nut X, which is bolted to the arm. By tightening the adjusting screw X^1, the diameter and consequently the circumference of the Sail Wheel is reduced, thus taking up the wear of the sail axles, and effectually preventing the sail sections from becoming detached. One or more of these adjusting Brackets may be used in each Sail Wheel.

The Pitman or Connecting Rod L has its upper end engaging with the Crank Pin K, and its lower end is jointed in the interior of the Pitman Pipe, as shewn at Figs 1 and 7, this

this combination entirely obviates all danger of the Pitman Pipe H becoming jammed or buckled in the guide through which it slides, in consequence of the side thrust and pull of the Crank when the Mill is working a double action or balanced Pump.

The lower end of the said Pitman Pipe may be attached to the pump rod by means of a Shackle X^2 and Nuts as shewn at Figs 1 and 3, or in any suitable manner.

The Weight or Balance Lever Y is fulcrumed at its elbow to the Horn D^1 upon the main L Bracket D, its lower end is formed with a fork and studs to engage with the groove in the Sliding Collar N, one of the forked ends having an extension to which is attached a chain or cord passing through an aperture in the Breast Piece C of the Turntable B and thence over a sheave Pulley E, shewn at Fig: 6, and descending in a straight line through the Pitman Pipe H to the ground for the purpose of stopping and starting the Windmill.

Having now described the several parts of my improved Windmill, I explain its general principle and mode of action to be as follows- The sail sections being pivoted in the manner set forth and illustrated, tend to assume a position parallel to the Axle or Shaft I of the Windwheel when in motion, owing to the influence of centrifugal force; thus presenting a varying surface or area to the wind, this tendency of the sails is restrained or balanced by means of the balance Lever Y and weight, which may be adjusted to vary the speed of

(7)

of the Mill.

Another important factor in connection with the self governing power of the Windmill, and which is especially valuable in sudden squalls, is the position of the sail axles, which are so placed that a greater external area is presented to the wind, which tends to force over the sails parallel with the main shaft I and thus becomes an important ~~factor~~ auxiliary to the action of the centrifugal force.

I claim as the Novelties of my Invention

1st The combination and arrangement of the metallic I shaped Bracket or Bearer D having a segmental Foot G, two bearings or journals formed either with solid eyes as at Figs 1 and 3 or having separate bushes or caps as at Fig: 12, and also a horn or extension D^1, substantially as illustrated and described in the drawings, and Specifications herewith.

2nd The Footstep F having an annular groove upon its upper surface and the tubular extension or guide upon its lower surface, in combination with the Bed Plate A also having an annular groove upon its upper surface, and in combination, with the Turntable B formed with a projecting Ring upon its lower surface, a Breast Piece C having a recess or gullet, and the Sheave Pulley, substantially as illustrated and described.

3rd The hollow shaft I in combination with the solid Crank J forged or cast on and provided with a taper Crank Pin K substantially as illustrated and described.

4th The Connecting or Pitman Rod L in combination with and jointed in the interior of the Pitman Pipe H as applied to Windmills, substantially as illustrated and described.

5th The Hub or Spider O having complete sockets or recesses formed to receive the inner ends of the Arms or Spokes of the sail Wheel and provided with (a) the Bracket P cast or affixed to the outer side of each alternate arm Box, substantially as illustrated and described.

6th The mechanism and general combination of the parts for reefing the sails comprising the outer Head R, the round Pins S flattened in the middle or at the ends, the Bell Cranks Q, Regulating or Radial Rods U, with the Links U^1 and Shackles V, also the flat Bars V^2 with reduced ends forming the axes of the sail sections, and the metallic Bands or Strips W bolted to the front side of the outer section Bars, substantially as illustrated and described.

7th The flanged Brackets or Arm Castings V^3, in combination with the Sliding Brackets W, formed with a Sleeve to slide upon the ends of the Arms and provided with an adjusting screw

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Screw and Nut substantially as illustrated and described.

6th The forked balance or Clutch Lever Y fulcrumed upon the Horn D' and having one of its forked ends extended in combination with the Chain or Cord and the Sheave Pulley E, substantially as illustrated and described.

And I do hereby for myself, my heirs, executors and administrators, covenant with Her Majesty Her Heirs and successors, that I believe the said invention to be a new invention as to the public use and exercise thereof, and that I do not know or believe that any other person than myself is the true and first inventor of the said invention, and that I will not deposit these presents at the Patent Office Melbourne with any such knowledge or belief as last aforesaid

In witness whereof I the said James Frederick Kilburn have hereunto set my hand and seal

(Sd) James Frederick Kilburn L.S.

Witness: Albert Swanson
Patent Agent

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Amended Specification 2 Sheets
Drawings 1 Sheet

I allow this Amended Specification together with drawings to be deposited to stand as the Specification of this invention in lieu of the Original Specification

(Signed) A. L. Wilson
Attorney General

Letters Patent have been granted in this case upon this Amended Specification with Drawings (10)

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I hereby certify that Specification Ten (10) Sheets and Drawings One (1) Sheet as before written and delineated hereon are copies of the Specification and Drawings deposited in the matter of Letters Patent No 4574 dated 29th May 1886 which have been granted to James Frederick Kilburn, the said Letters Patent being in force in Victoria

J O Wilson Strick
Deputy Regr General

PATENT OFFICE · MELBOURNE, VICTORIA

21 May 1887

21 May 1886

21/5/87