



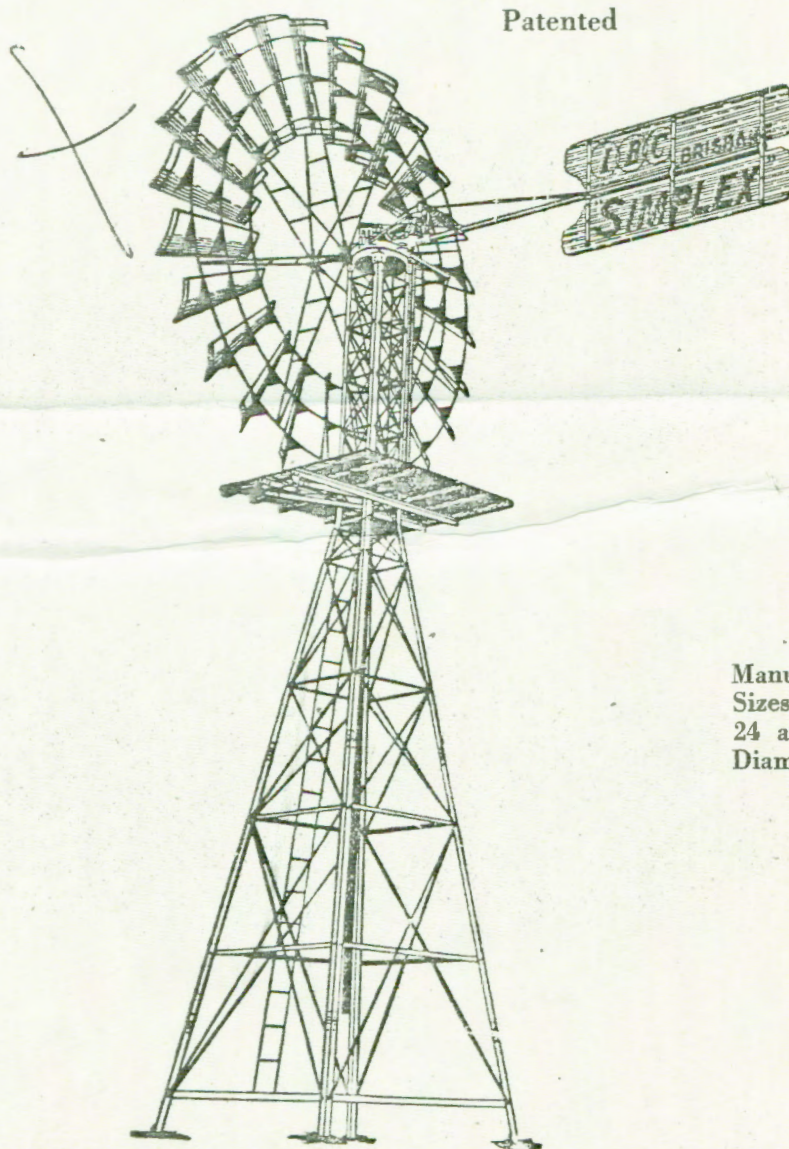
INTERCOLONIAL
BORING CO LTD



I.B.C. "Simplex" Direct-Acting Windmills

(GREASE LUBRICATED)

Patented



Manufactured in
Sizes: 12, 16, 20,
24 and 28 Feet
Diameter Wheels

Fig. A.1

Special Features

Direct Acting, Double Bearing, Centre Lift, Long Pumping Stroke

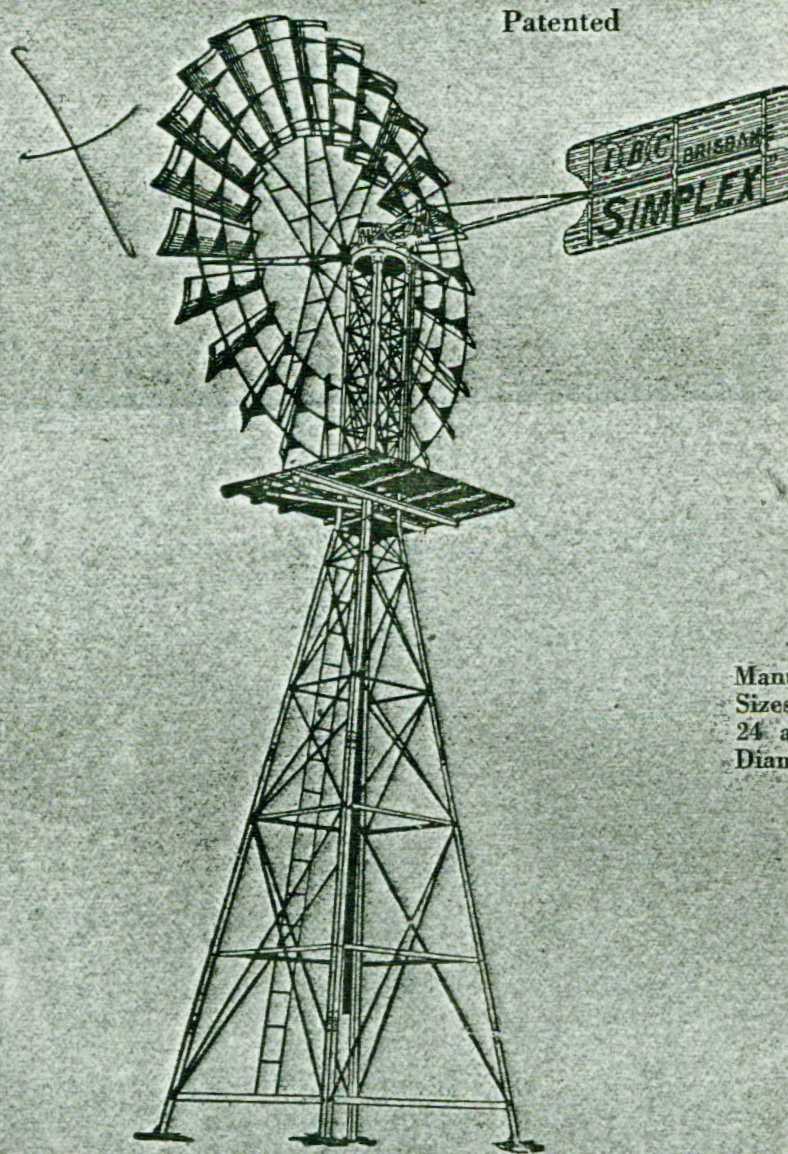


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I.B.C. "Simplex" Direct-Acting Windmills

SIMPLE, STRONG and POWERFUL

Upper Vane Hinge, with large grease cup for efficient lubrication.

Vane Brace ensures a perfectly rigid vane.

Connecting Rod Bearing is of massive design, with large grease cup to ensure efficient lubrication.

Crank Shaft.—Solid special steel, of large diameter, and forged by special machinery. The I.B.C. "Simplex" has no cast iron discs keyed on, or wrist pins with nuts that will work loose and cause trouble.

Long Main Bearings, of special alloy, are die cast, perfectly accurate in all dimensions, and interchangeable. They will last for years and can be replaced in a few minutes with small expense.

Wheel Arm Spiders of high grade cast steel shrunk on and keyed to the shaft make it impossible for them to work loose, or to be taken off.

Turntable of specially large diameter thus giving great stability. It works on a large number of hardened steel balls. A ring placed below the main casting and bolted to the turntable and containing a large number of hardened steel balls, resists any force tending to lift the turntable. These ball bearings enable the windmill to respond promptly to the slightest change in the direction of the wind. There is no mast pipe to wear out and give trouble.

Pull Out Rod passes directly through the centre of the universal swivel.

Connecting Rod.—The length of the Connecting Rod in each size Mill is greater than half the diameter of the wind wheel, giving small obliquity—no strain on the rocker arm—no pressure on the rocker arm pivots—no friction—no wear and providing a direct vertical lift to the pump rods.

Universal Swivel on the lower end of the connecting rod is free to rotate and oscillate in any direction as required by the varying direction of the wind. The grease cup with special fitting lid holds sufficient grease for one year.

Rocker Arm—situated below the platform, its length being at least twice as great as that on other windmills. It gives a practically straight-line motion, with very little strain and wear. The tower angles and part of the platform have been cut to show clearly the working of the Rocker Arm and Universal Swivel.

Windmill Pump Rod, of Oregon Pine, is connected to the Universal Swivel by steel splice plates.

Vane.—The weight of the vane is the governing element in the I.B.C. "Simplex" Windmill. It is perfectly automatic in its action.

Turntable Grease Box is conveniently situated just above the inspection ladder, and holds sufficient grease for one year.

Inspection Ladder.—When you step on this inspection ladder you are perfectly safe, for it moves with the mill, and from it you can see all parts of the I.B.C. "Simplex" Windmill in full operation. The attendant can sit on the top of this ladder, grease, or effect any repairs that may be necessary, and watch the silent working of the windmill.

Large Platform, made of specially selected hardwood decking on stout hardwood joists, which, in turn, are bolted to substantial steel angles.

Pull Out Wire Guide.—The pull out wire passes from the swivel through the pull out wire guide to the pull out winch below. This guide prevents any wear on the pull out wire.

Tower Legs of angle steel, butt one on the other and are secured with heavy angle splice pieces placed inside the legs and strongly bolted. This method prevents all shearing stress on the bolts and makes a firm leg from top to bottom. All holes are punched in jigs with special machinery, which ensures accuracy in every case and the certainty that they will go together easily.

Fig. A.3



I.B.C. "Simplex" Windmills

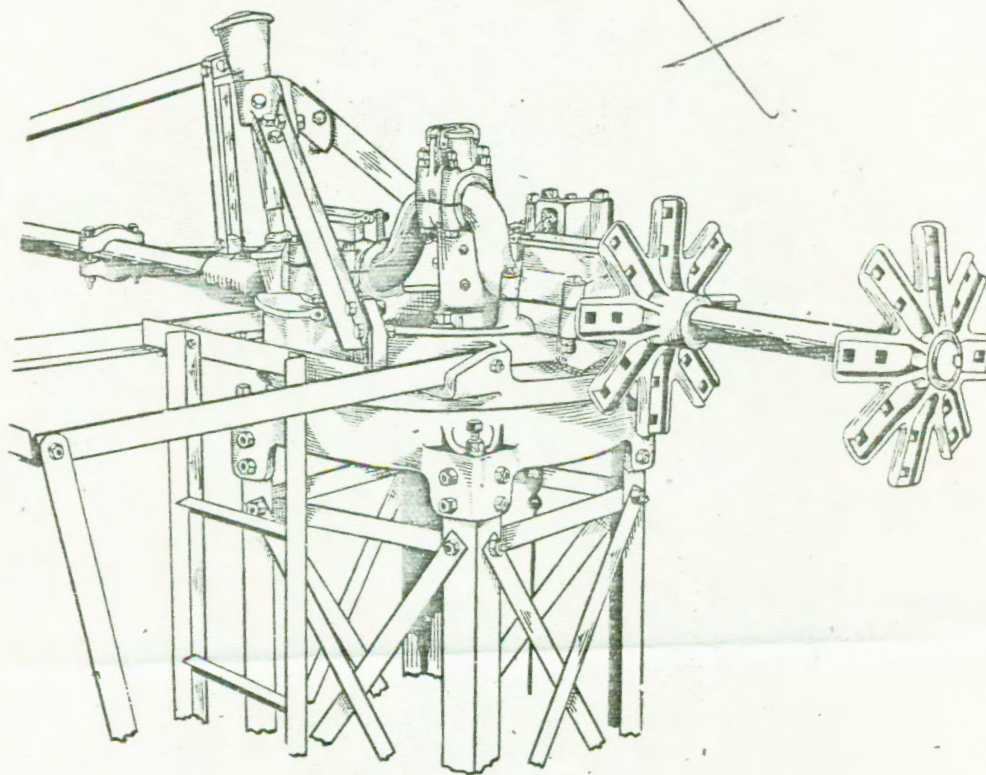


Fig. A.3

Showing Wind Engine, Wheel Spiders, Crank Shaft and Inspection Ladder

WIND ENGINE

It is built low down on the top of the tower, eliminating the severe racking strains and wear caused by the leverage of high and heavy super-structures.

It is made throughout of semi-steel, cast steel and mild steel, giving the greatest possible strength for the weight of material used. The design also lends itself to withstand great strain with minimum weight, and the form of all castings is such that no internal strains are set up during manufacture.

STROKE

The length of stroke has been fixed to suit the average conditions of depth of bore and diameter of pump cylinder to raise the maximum quantity of water with the lightest serviceable winds.

CRANK SHAFT

Large diameter solid special steel crankshafts, forged by special machinery, are provided with long journals on each side of the crank; they are perfectly interchangeable, hence, should it be necessary through any cause to replace one, any handy man could do the

job in a few hours. There are no separate crank discs, pins, or nuts to work loose and cause trouble.

WHEEL SPIDERS

These are steel castings fully annealed, and are considerably lighter than cast iron for a given strength. They are bored out a definite amount smaller than the diameter of the crankshaft, are heated and shrunk on the shaft against shoulders turned thereon, and are also strongly keyed. These spiders cannot shift or work loose, and will never give trouble. Many pounds weight are saved to our clients in freight, railage and carriage.

BEARINGS

Two long bearings of special anti-friction metal are provided for the crankshaft, one being placed on either side of the crank. These shaft bearing liners and also those on the crank-pin are die-cast and therefore accurate in all dimensions. In the end of the rear bearing is placed the ball thrust bearing. Any of these bearings may be renewed in a few minutes. All bearings are lubricated with our I.B.C. Special Crankshaft Grease.

Use only the special grease that we supply.

I.B.C. "Simplex" Windmills

CRANK PIN

The crank pin is forged solid with and turned to the same diameter as the crankshaft. There are, therefore, no loose parts. Built up cranks are the main source of trouble in windmills, all of which have been entirely done away with in the I.B.C. "Simplex" solid forged special steel shaft.

UNIVERSAL SWIVEL

On the lower end of the connecting rod is bolted an accurately machined spherical steel casting, which, with the housing pivoted to the inner end of the rocker arm, comprises the universal swivel, free to rotate and oscillate in any position as required by the varying direction of the wind. The swivel is placed just below the platform where it can be examined both from above and below, and there is nothing in the way to interfere with greasing or adjusting same.

CONNECTING ROD

The position of the rocker arm below the platform makes possible the use of a connecting rod, the length of which is greater than half the diameter of the wind wheel. The advantages of this long connecting rod are obvious—small obliquity, practically no strain on rocker arm, no pressure on pivots, no friction, no wear, and a direct vertical lift to pump rods.

Efficient Lubrication.—Every working part of the I.B.C. "Simplex" Windmill is lubricated and provided with grease cups. They are all within easy reach of the ladder and are sufficiently large to last a year without refilling.

Wheel Arm Spiders of high grade cast steel shrunk on and keyed to the shaft make it impossible for them to work loose or to be taken off. They take the place of cast iron spiders as furnished with other windmills, reducing considerably the cost of carriage.

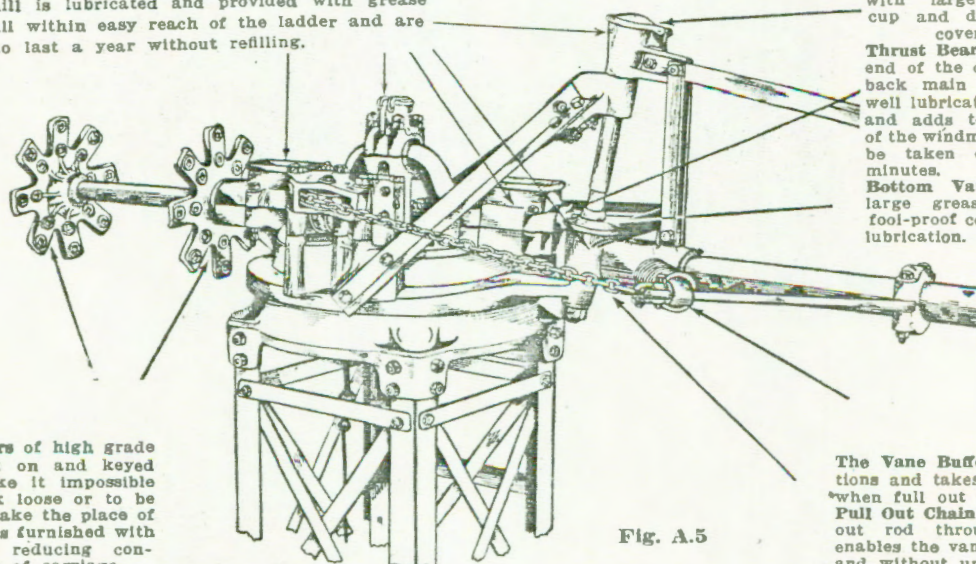


Fig. A.5

Showing Turntable, Bearings, Vane Hinges and Pull-Out Gear

TURNTABLE.—The efficiency of a windmill depends in a great measure upon its ability to face about to the varying direction of the wind. The I.B.C. "Simplex" turntable is of large diameter, thus giving stability; and the weight of the wind engine is carried on a large number of hard steel balls running in accurately machined races, thus ensuring durability and enabling the mill to respond promptly to the slightest change in the direction of the wind. Another row of steel balls resists any force tending to lift the engine off the tower. The mast pipe is eliminated and all working parts are visible and easily accessible.

ROCKER ARM

This is pivoted at its outer end to brackets which are bolted to the ends of the angles which support the platform. At the inner end the universal swivel is pivoted. The length of the I.B.C. "Simplex" rocker is twice as great as on other windmills, and gives what is practically a straight line motion to top end of the pump rods. Because the angle of vibration is less the wear on the pivots is also less.

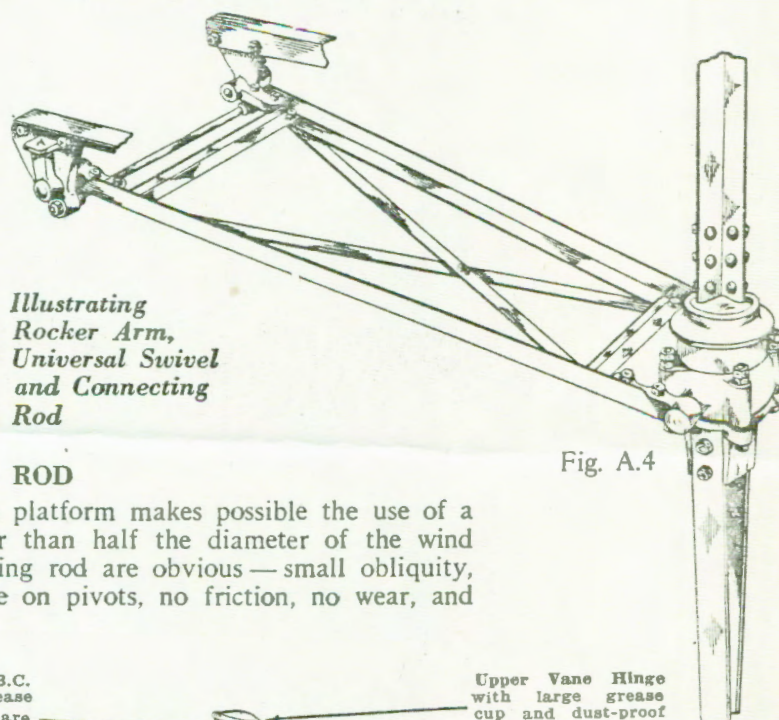


Fig. A.4

Upper Vane Hinge with large grease cup and dust-proof cover.

Thrust Bearing, fitted at the rear end of the crank shaft within the back main bearing, and always well lubricated. It reduces friction and adds to the efficient working of the windmill. If desired, it can be taken out in a couple of minutes.

Bottom Vane Hinge has extra large grease cup with special fool-proof cover, ensuring constant lubrication.

The **Vane Buffer** acts in both directions and takes the buff of the vane when full out or when fully furled. **Pull Out Chain** connected to the pull out rod through special sheaves, enables the vane to be furled quickly and without undue strain.



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I.B.C. "Simplex" Windmills

CRANK PIN

The crank pin is forged solid with and turned to the same diameter as the crankshaft. There are, therefore, no loose parts. Built up cranks are the main source of trouble in windmills, all of which have been entirely done away with in the I.B.C. "Simplex" solid forged special steel shaft.

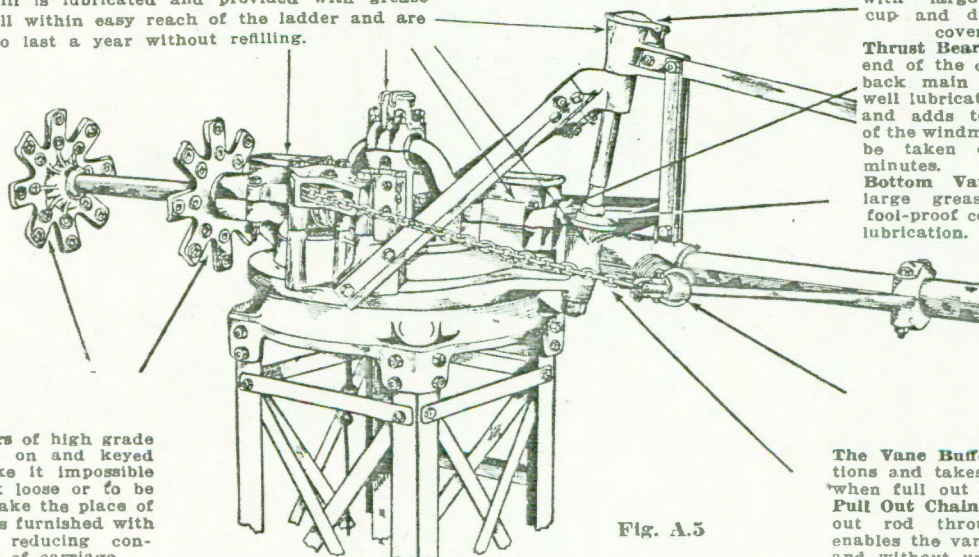
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CONNECTING ROD

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Upper Vane Hinge with large grease cup and dust-proof cover.

Thrust Bearing, fitted at the rear end of the crank shaft within the back main bearing, and always well lubricated. It reduces friction and adds to the efficient working of the windmill. If desired, it can be taken out in a couple of minutes.

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*Illustrating
Rocker Arm,
Universal Swivel
and Connecting
Rod*

Fig. A.4

Fig. A.5



I.B.C. "Simplex" Windmills

THRUST BEARING

The thrust bearing is the fulcrum from which the pressure of the wind reacts, and is therefore extremely important to the efficient working and durability of the windmill. The I.B.C. "Simplex" ball thrust bearing is made from the finest material and highest grade of workmanship that the world can supply. It is fitted at the rear end of the crankshaft within the back main bearing and can be examined or taken out and replaced in a few minutes, the only tool required being a spanner to fit the nuts of the back bearing cap of the crankshaft. It runs continuously in the grease of the back bearing.

BALANCE WEIGHTS

Balance weights are supplied on all I.B.C. "Simplex" Windmills, to balance the pump rods, and a portion of the water column. The weights are relatively small and are placed on the outer end of that wheel arm which is directly opposite the crank. These weights should be so placed that the Windmill will stop in a calm with the plunger at the top of the stroke.

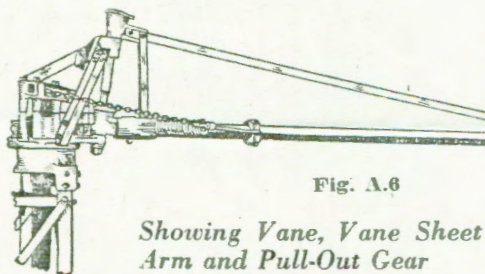
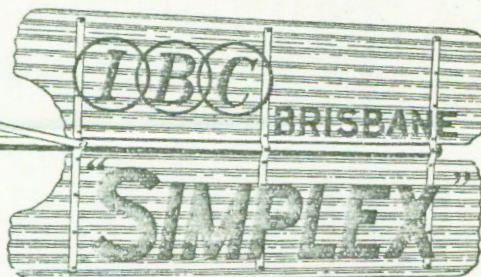


Fig. A.6

Showing Vane, Vane Sheet Arm and Pull-Out Gear



GOVERNOR

The function of the governing device in a windmill is to hold the wheel facing the wind until the pressure exceeds a certain limit, after which the wheel is allowed to blow round horizontally, by stages, towards the vane, as the velocity of the wind increases. This reduces the effective area of the sails, consequently it prevents the wheel racing and incidentally reduces the strain on the tower and the entire mechanism. To keep the wheel facing the wind and to prevent it blowing toward the vane requires, therefore, some definite resistance, according to the velocity of the wind in which is desired the mill should work. In the I.B.C. "Simplex" this resistance is the definite weight of the vane, raised a definite height, for every degree by which the angle between the wheel and the vane is reduced as the pressure of the wind increases beyond the pre-determined amount allowable.

LUBRICATION

The I.B.C. "Simplex" is designed so that every working part, no matter how apparently unimportant, is continuously and efficiently lubricated. The bearing boxes containing the lubricant are covered to exclude rain, dust or sand.

The special I.B.C. "Simplex" Lubricating Grease must be used throughout. It possesses all the properties required for this ideal method of lubrication. It will not melt or run during the heat of summer, neither will it harden in the winter.

WIND WHEEL

This is very strongly designed on scientific and mechanical lines, enabling it to withstand the heavy strains put on it by the forces of the wind during storms. The wheel arms are strongly braced, and all parts are of exact dimensions, being made by special machinery. The sails are correctly designed, the area, angle and set being such that every square inch contributes its quota to utilising the power of the wind. This correct proportion and the absence of unnecessary projecting parts does away with all roaring noises; in fact in this and all other respects it is the Silent "Simplex" Windmill. The sails are made of heavy gauge galvanized steel, corrugated at both ends, which greatly adds to their stiffness, besides giving them a very neat appearance.

BRAKE

The correct relative position for wheels and vanes of the I.B.C. "Simplex" Windmills to attain when in the extreme out position under the influence of a gale, has been calculated with great precision, and a brake under these conditions is quite unnecessary. There is no danger of the Windmill running backward when governing in a gale.

INSPECTION LADDER

Close to the underside of the wind wheel is a large square platform built of heavy hardwood and attached to the tower with strong steel angles. This platform is reached by a steel ladder. Above the platform is a strong steel inspection ladder secured to the turntable and revolving with it, as illustrated in Fig. A.3. When the attendant steps on this ladder it ceases to be a matter for concern to him how the direction of the wind varies, for he is perfectly safe. When he reaches the top there is behind him a safety bar which makes it impossible for him to fall. From this position all bearings and working parts are easily reached, so that lubrication is easily attended to and inspection made without danger.

PULL-OUT WINCH

A strong worm gear pull-out winch is supplied, which will hold the vane in any position without ratchets or pawls. It is easily and conveniently operated. The pull-out wire has a direct passage through the swivel, and will not catch or wear when the mill is working.

All heavy superstructures, short connecting rods, short rocker arms with short supports, discs with wrist pins and nuts, heavy wheel spider castings, brake bands and levers, short pitman rods, wood bearings, springs, mast pipes, small turntables, etc., which are the troublesome parts in windmills and increase the cost of the windmill and freight, railage, cartage, and erection, have been omitted in the design of the "Simplex."

WEIGHTS OF "SIMPLEX" DIRECT-ACTING WINDMILLS AND TOWERS

Size Mill	Mill Only	With 30ft. Tower	With 40ft. Tower	With 50ft. Tower	With 60ft. Tower
Ft.	cwt. qrs. lbs.	cwt. qrs. lbs.	cwt. qrs. lbs.	cwt. qrs. lbs.	cwt. qrs. lbs.
12	7 3 3	16 1 7	19 0 27	22 0 27	26 0 0
16	15 2 22	26 0 0	29 3 27	33 0 0	37 0 0
20	23 3 15	—	42 1 25	44 2 24	50 0 0
24	33 0 4	—	56 0 17	60 0 0	64 0 0
28	49 2 19	—	—	82 0 0	88 0 0

The Tower

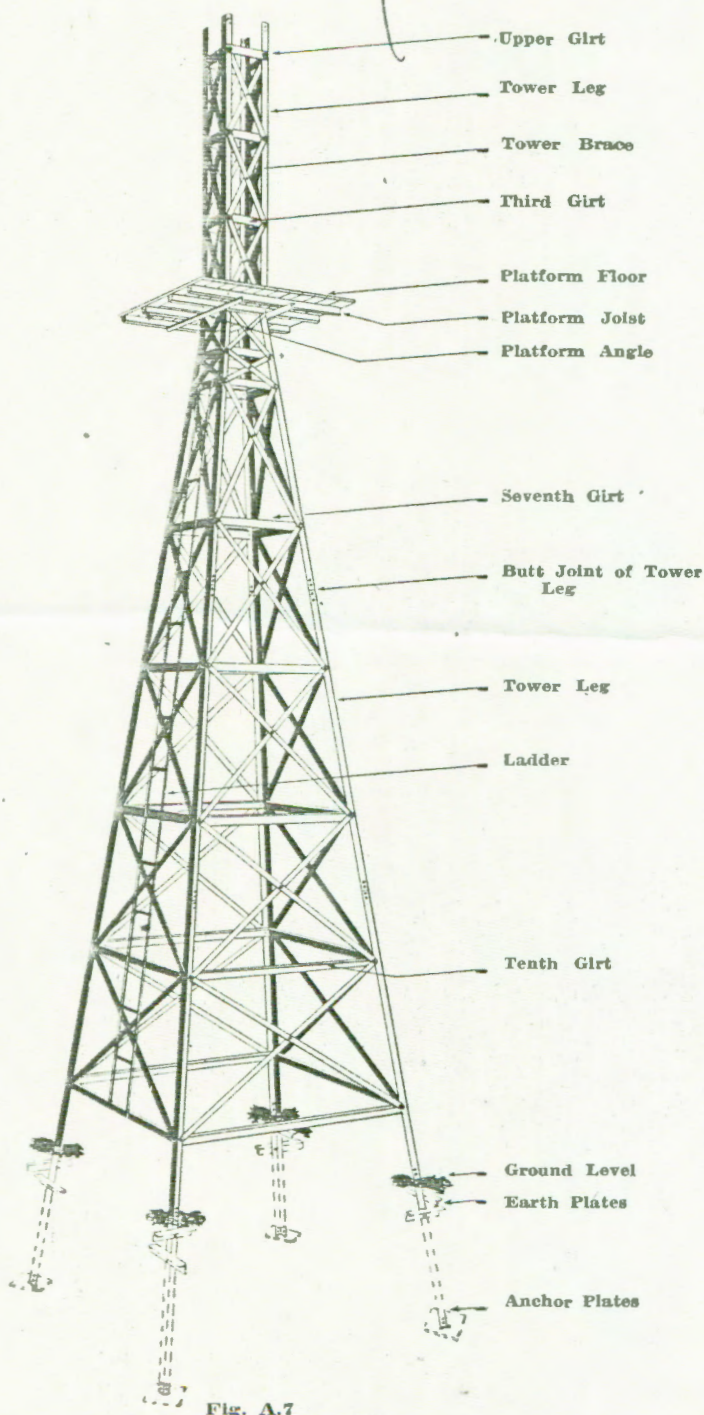


Fig. A.7

I.B.C. "Simplex" Windmill Towers are the strongest and simplest towers made. The tower legs, which are of angle steel, butt one on the other, and are secured with heavy angle steel spliced pieces placed inside the legs and strongly bolted. This method prevents all shearing stress on the bolts and makes a firm leg from top to bottom. The girts are of angle steel and the braces are flat steel. All bolt holes are punched in jigs with special machinery which ensures accuracy in every case, making them go together easily. The legs are in 10-foot sections, which make them easy to erect and also to handle when transporting, minimum rates of railage and less liability to damage in transit are also obtained.

All I.B.C. "Simplex" towers have four legs (which is the strongest form that can be built). The platforms are extra large and are made of first quality hardwood supported by steel angles strongly bolted to the tower.

A strong ladder of steel is bolted to one side of the tower and extends from the ground to the platform.

Bush timber posts are not recommended for towers as these move in time owing to the action of the wet weather and other conditions.

All towers are well painted with anti-rust paint when all work on them has been completed.

NOTE.—I.B.C. Special Windmill Grease must be used on all "Simplex" Windmills to ensure satisfactory service.

*Tower Measurements Given Are Taken From
Ground Level*

PRICES OF I.B.C. "SIMPLEX" DIRECT-ACTING WINDMILLS

Size of Windmill	Price of Windmill	Price With 30ft. Tower	Price With 40ft. Tower	Price With 50ft. Tower	Price With 60ft. Tower
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
12ft.	30 0 0	48 0 0	54 0 0	62 0 0	72 0 0
16ft.	54 0 0	—	85 0 0	100 0 0	120 0 0
20ft.	86 0 0	—	129 0 0	145 0 0	165 0 0
24ft.	145 0 0	—	185 0 0	190 0 0	210 0 0
28ft.	200 0 0	—	210 0 0	260 0 0	280 0 0

Capacities of I.B.C. "Simplex" Windmills

Showing lengths of Stroke and sizes of Cylinders to be used at various depths with wind velocities of 10 and 12 miles per hour

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SIZES: 8ft. to 16ft.

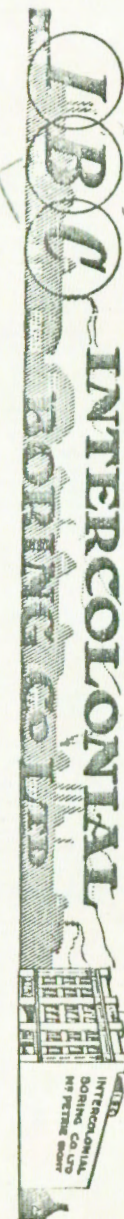
Cylinder		2½ inch			2¾ inch			3 inch			3½ inch			4 inch			4½ inch			5 inch		
Size of Mill	Stroke in Inches	Elevation in Feet	Gallons per Hour 10 Mile Wind	Gallons per Hour 12 Mile Wind	Elevation in Feet	Gallons per Hour 10 Mile Wind	Gallons per Hour 12 Mile Wind	Elevation in Feet	Gallons per Hour 10 Mile Wind	Gallons per Hour 12 Mile Wind	Elevation in Feet	Gallons per Hour 10 Mile Wind	Gallons per Hour 12 Mile Wind	Elevation in Feet	Gallons per Hour 10 Mile Wind	Gallons per Hour 12 Mile Wind	Elevation in Feet	Gallons per Hour 10 Mile Wind	Gallons per Hour 12 Mile Wind	Elevation in Feet	Gallons per Hour 10 Mile Wind	Gallons per Hour 12 Mile Wind
8 ft. ..	3½	65	220	260	55	270	320	50	320	400	35	430	510	25	570	680	20	720	860	20	890	1060
12 ft. ..	6	175	210	250	135	250	300	115	300	360	80	410	490	65	540	650	55	680	810	40	850	1020
16 ft. ..	9	285	280	330	230	340	410	195	410	490	150	560	670	120	730	870	90	930	1110	80	1140	1360

SIZES: 16ft. to 28ft.

Cylinder		2½ inch			2¾ inch			3½ inch			4 inch			4½ inch			5 inch			5½ inch		
Size of Mill	Stroke in Inches	Elevation in Feet	Gallons per Hour 10 Mile Wind	Gallons per Hour 12 Mile Wind	Elevation in Feet	Gallons per Hour 10 Mile Wind	Gallons per Hour 12 Mile Wind	Elevation in Feet	Gallons per Hour 10 Mile Wind	Gallons per Hour 12 Mile Wind	Elevation in Feet	Gallons per Hour 10 Mile Wind	Gallons per Hour 12 Mile Wind	Elevation in Feet	Gallons per Hour 10 Mile Wind	Gallons per Hour 12 Mile Wind	Elevation in Feet	Gallons per Hour 10 Mile Wind	Gallons per Hour 12 Mile Wind	Elevation in Feet	Gallons per Hour 10 Mile Wind	Gallons per Hour 12 Mile Wind
16 ft. ..	9	330	230	275	230	340	410	180	480	570	120	730	870	105	830	990	75	1140	1370	75	1260	1510
20 ft. ..	12	495	250	300	375	370	440	265	520	620	185	780	930	160	890	1060	120	1220	1460	105	1350	1620
24 ft. ..	14	770	240	285	630	360	430	395	500	600	265	760	910	250	860	1030	170	1190	1420	155	1310	1570
28 ft. ..	16							570	485	580	375	730	875	330	830	990	245	1150	1380	205	1260	1510

SIZES: 16ft. to 28ft.

Cylinder		6 inch			6½ inch			6¾ inch			7½ inch			8 inch			10 inch		
Size of Mill	Stroke in Inches	Elevation in Feet	Gallons per Hour 10 Mile Wind	Gallons per Hour 12 Mile Wind	Elevation in Feet	Gallons per Hour 10 Mile Wind	Gallons per Hour 12 Mile Wind	Elevation in Feet	Gallons per Hour 10 Mile Wind	Gallons per Hour 12 Mile Wind	Elevation in Feet	Gallons per Hour 10 Mile Wind	Gallons per Hour 12 Mile Wind	Elevation in Feet	Gallons per Hour 10 Mile Wind	Gallons per Hour 12 Mile Wind	Elevation in Feet	Gallons per Hour 10 Mile Wind	Gallons per Hour 12 Mile Wind
16 ft. ..	9	55	1650	1980	50	1790	2140	45	2090	2500	40	2410	2890	30	2930	3510	20	4580	5490
20 ft. ..	12	85	1760	2110	75	1910	2290	65	2230	2675	55	2570	3120	45	3130	3750	30	4890	5870
24 ft. ..	14	110	1715	2050	100	1860	2230	95	2165	2600	85	2500	3000	65	3045	3650	45	4760	5710
28 ft. ..	16	165	1660	1990	150	1790	2150	130	2110	2530	110	2440	2920	95	2950	3540	55	4620	5540



List of Parts of I.B.C. "Simplex" Direct-Acting Windmills

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- | No of Part | DESCRIPTION |
|--------------------|---|
| 1. | Main Casting (Turntable) |
| 2. | Lid for Grease Box |
| 3. | Front Bearing Cap |
| 4. | Lid for Bearing Cap Grease Boxes |
| 5. | Rear Bearing Cap |
| 6. | Vane Sheet Block |
| 7. | Vane Hinge Bracket |
| 8. | Lower Vane Hinge |
| 9. | Lid for Lower Vane Hinge |
| 10. | Upper Vane Hinge |
| 11. | Lid for Upper Vane Hinge |
| 12. | Vane Pipe Clamp |
| 13. | Bedplate |
| 14. | Adjustable Ballrace |
| 15. | Pullout Chain Bracket |
| 16. | Pullout Chain Sheave |
| 17. | Connecting Rod (Big End) |
| 18. | Connecting Rod Cap |
| 19. | Lid for Connecting Rod Cap |
| 20. | Swivel Box (Upper) |
| 21. | Swivel Box (Lower) |
| 22. | Swivel Box Cap |
| 23. | Rocker Pivot |
| 23a. | Rocker Pivot Casting (inside on 5 ft. mills only) |
| 24. | Rocker Brackets |
| 25. | Rocker Brackets (Grease Box Lid) |
| 26. | Pullout Wire Guide |
| 27. | Balance Weight |
| 28. | Thrust Washer Bearings (Races) |
| 29. | Thrust Washer Ball Cage |
| 30. | Swivel Box (Inner) |
| 31. | Crankshaft |
| 32. | Spider (Front) |
| 33. | Spider (Rear) |
| 34. | Crankshaft End Packing Piece |
| 35. | Front Renewable Bearing |
| 36. | Rear Renewable Bearing |
| 37. | Connecting Rod Bearings |
| 38. | Turntable Balls |
| 39. | Pin for Pullout Chain Sheaves |
| 40. | Pullout Chain |
| 41. | Rocker Side (Left Hand) |
| 41a. | Rocker Side (Right Hand) |
| 42. | Rocker Brace |
| 43. | Rocker Crosspiece Long |
| 44. | Rocker Crosspiece, Short |
| 45. | Rocker Tie Rod |
| 46. | Connecting Rod |
| 47. | Swivel Splice Plates |
| 48. | Wheelarm Knees No. 1 |
| 49. | Wheelarm Knees No. 2 |
| 50. | Wheelarm Knees No. 3 |
| 51. | Wheelarm Knees No. 4 |
| 52. | Wheelarm Complete |
| 53. | Bands (Inner) |
| 54. | Bands (Middle) |
| 55. | Bands (Outer) |
| 56. | Sail Complete |
| 57. | Sail Clip (Small) |
| 58. | Sail Clip (Intermediate) |
| 59. | Sail Clip (Large) |
| 60. | Vane Sheet (not shown) |
| 61. | Vane Pipe |
| 62. | Vane Struts |
| 63. | Vane Stays |
| 64. | Buffer Bar |
| 65. | Buffer Spring Carrier |
| 66. | Vane Hinge Bar |
| 67. | Vane Rib |
| 68. | Vane Brace (Long) |
| 69. | Vane Brace (Short) |
| 70. | Vane Buffer Spring |
| 71. | Revolving Ladder Crosspiece |
| 72. | Revolving Ladder Side (Left Hand) |
| 72a. | Revolving Ladder Side (Right Hand) |
| 73. | Revolving Ladder Support (Right Hand) |
| 74. | Revolving Ladder Support (Left Hand) |
| 74a. | Revolving Ladder Support (Right Hand) |
| 75. | Revolving Ladder Safety Bar |
| 76. | Revolving Ladder Brace |
| WINCH PARTS | |
| J.W. 1. | Winch Body with Spindle |
| J.W. 2. | Worm and Spindle |
| J.W. 3. | Wormwheel and Drum |
| J.W. 4. | Clamp Piece |
| J.W. 5. | Handle |
| J.W. 6. | Chain |

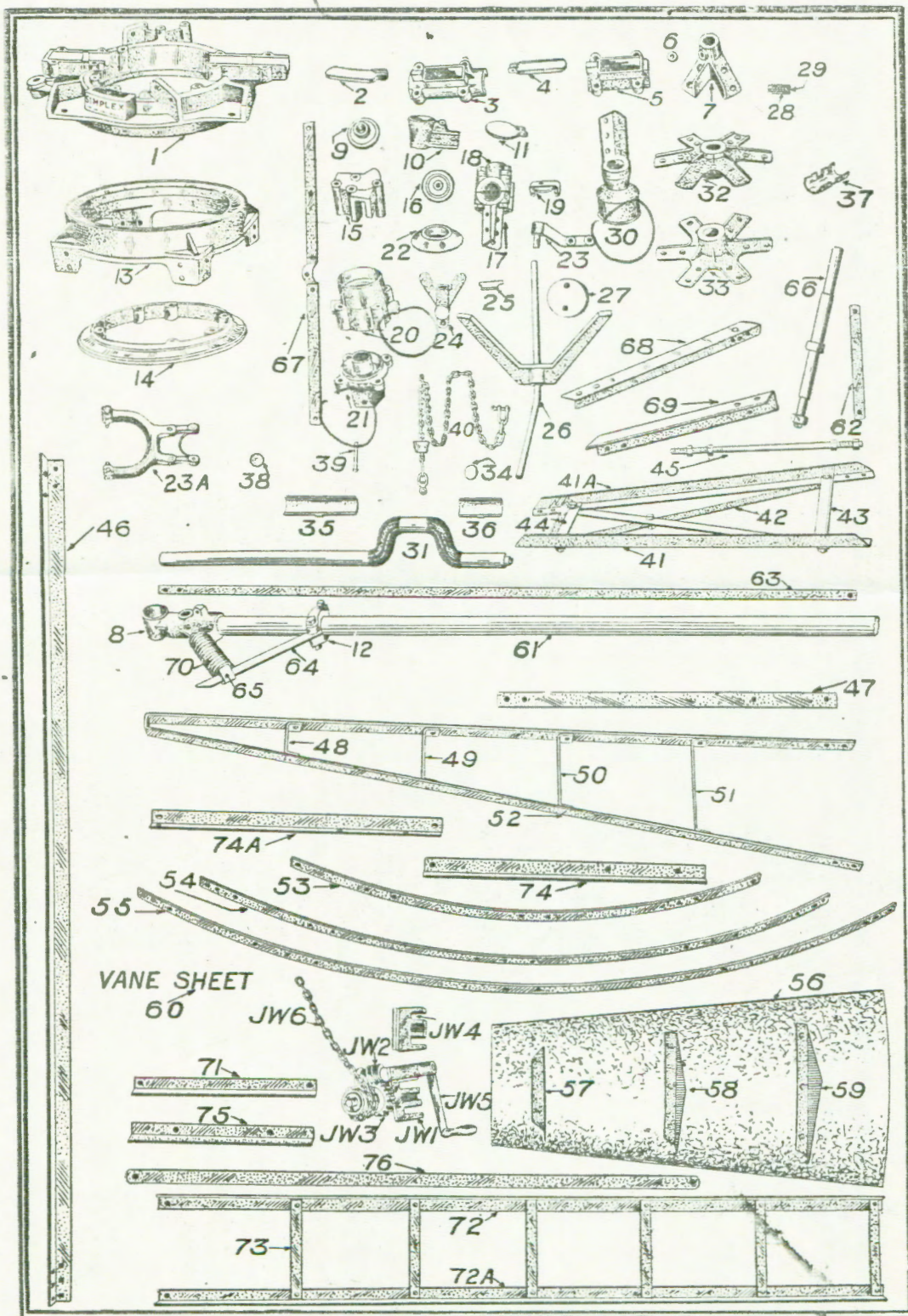


Fig. A.8

When ordering duplicate parts for I.B.C. "Simplex" Windmills, customers are specially requested to always state:—(1) Number of Part; (2) Name of Part; (3) Size of Windmill; (4) Registered Number of Windmill; (5) Date of Windmill was supplied.

A full record of all particulars relating to I.B.C. "Simplex" Windmills supplied by us is kept at our Head Office, and if the above information is furnished correctly much delay will be avoided, and furthermore, the new parts will be correct.