

## F03D

### WIND MOTORS

#### Definition statement

*This place covers:*

Mechanisms for converting the energy of wind into useful mechanical power.

In particular:

Wind motors with rotation axis substantially parallel to the flow of air entering the machine

Wind motors with rotation axis substantially at right angle to the flow of air entering the machine

Other wind motors

Controlling wind motors

Adaptations of wind motors for special use

Combinations of wind motors with apparatus driven thereby

Other details, component parts, or accessories of wind motors

#### Relationships with other classification places

[F03D](#) covers mechanisms for converting natural wind energy into useful mechanical energy, and the transmission of such mechanical energy to its point of use. Electrical power generation aspects of wind motors (e.g. dynamo-electric conversion and electric generators) are classified in [H02P](#). Arrangements or systems for supplying or distributing electric power are classified in [H02J](#). Circuit arrangements or sy

#### References

##### Limiting references

*This place does not cover:*

Circuit arrangements or systems for supplying or distributing electronic power	<a href="#">H02J</a>
Control or regulation of electric generators, or dynamo-electric converters	<a href="#">H02P</a>

##### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Vehicles for transportation	<a href="#">B60P 3/40</a>
Propulsive devices of ships or other waterborne vessels directly acted on by wind, using the Magnus effect	<a href="#">B63H 9/02</a>
Rotors for airplanes and helicopters	<a href="#">B64C 27/00</a>
Handling by cranes, hoisting, lifting	<a href="#">B66C</a>
Machines or engines for liquids, Water turbines	<a href="#">F03B</a>
Ventilators	<a href="#">F04D 25/08</a>
Dynamo-electric machines	<a href="#">H02K</a>
Structural association of electric generator with mechanical driving motor in dynamo-electric machines, e.g. turbine	<a href="#">H02K 7/18</a>

## Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

Rotor	Wind engaging parts of the wind motor and the rotary member carrying them
Rotation axis	Axis of rotation of the rotor

## Synonyms and Keywords

In patent documents, the following abbreviations are often used:

HAWT	Horizontal Axis Wind Turbine
VAWT	Vertical Axis Wind Turbine

In patent documents, the following words/expressions are often used as synonyms:

- "wind turbine", and "windmill"
- "azimuth angle", and "yaw angle"
- "rotor hub", "rotor cone" and "spinner"

## F03D 1/00

**Wind motors with rotation axis substantially parallel to the air flow entering the rotor (controlling thereof [F03D 7/02](#))**

### Definition statement

*This place covers:*

Wind motors having their rotation axis substantially parallel to the flow of air entering the machine. When the flow has been guided into a direction other than the original wind direction, the final flow into the wind motor should be considered for classification.

### References

#### Limiting references

*This place does not cover:*

Controlling of wind motors	<a href="#">F03D 7/02</a>
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#### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Solar updraft	<a href="#">F03G 6/045</a>
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## F03D 3/00

**Wind motors with rotation axis substantially perpendicular to the air flow entering the rotor (controlling thereof [F03D 7/06](#))**

### Definition statement

*This place covers:*

Wind motors having their rotation axis substantially perpendicular to the flow of air entering the machine. When the flow has been guided into a direction other than the original wind direction, the final flow into the wind motor should be considered for classification.

### References

#### Limiting references

*This place does not cover:*

Controlling of wind motors	<a href="#">F03D 7/06</a>
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## F03D 3/0427

**{with augmenting action, i.e. the guiding means intercepting an area greater than the effective rotor area ([F03D 3/0463](#), [F03D 3/049](#) take precedence)}**

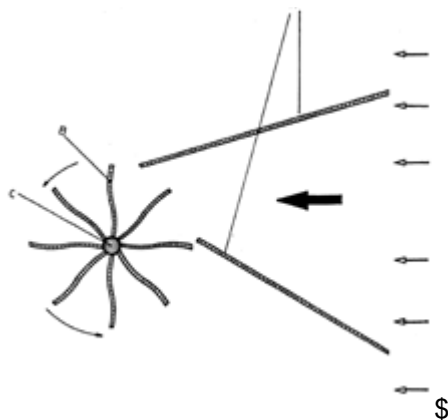
### Definition statement

*This place covers:*

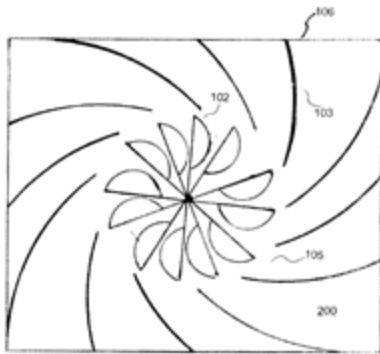
Wind motors characterised by the "effective area" of the rotor which is the cross section area of the rotor which contributes positively, i.e. causes a torque in/ to the desired rotation. The "augmenting" guiding means are those guiding means which intercept an area of flow greater than this "effective rotor area", and direct the flow into the rotor. The guiding means which fulfil this intercepting role are bounded on all sides from inlet to outlet into rotor, and therefore also accelerate or "concentrate" the flow into the rotor.

Example:

EP0226526



GB2420831



### Special rules of classification

When the guiding means form also a shield means on one side of the rotor [F03D 3/0463](#) or [F03D 3/049](#) take precedence.

### F03D 3/0454

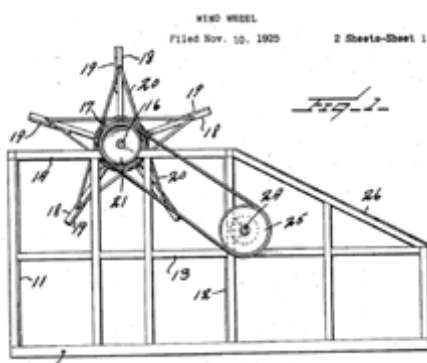
{and only with concentrating action, i.e. only increasing the airflow speed into the rotor ([F03D 3/0463](#) takes precedence)}

### Definition statement

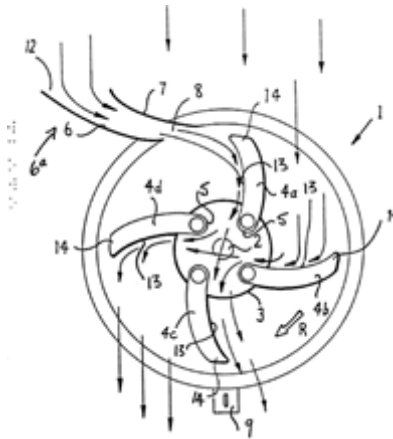
*This place covers:*

Wind motors with a concentrating means, i.e. the guiding means only increase the flow speed into the rotor without intercepting an area of flow greater than the effective rotor area (see definition of this effective area in [F03D 3/0427](#) entry). These concentrating guiding means can be either bounded on all sides or only on some.

US1596373



AU597755B (see channel 12)



### F03D 3/067

{the wind engaging parts having a cyclic movement relative to the rotor during its rotation}

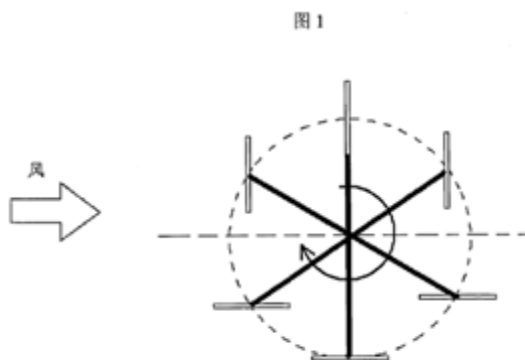
#### Definition statement

*This place covers:*

Wind motors wherein the wind engaging parts, i.e. the blades, vanes, paddles or cups, undergo a change of orientation within each cycle of rotation of the wind rotor, coming back to their original position after each revolution. This change of orientation happens of itself, passively, the direct result of the wind acting on the wind engaging parts as the relative wind direction changes with the rotation.

Example:

WO2010102517



**F03D 3/068**

{the cyclic relative movement being coupled to the movement of rotation;  
Controlling same, e.g. according to wind direction or force}

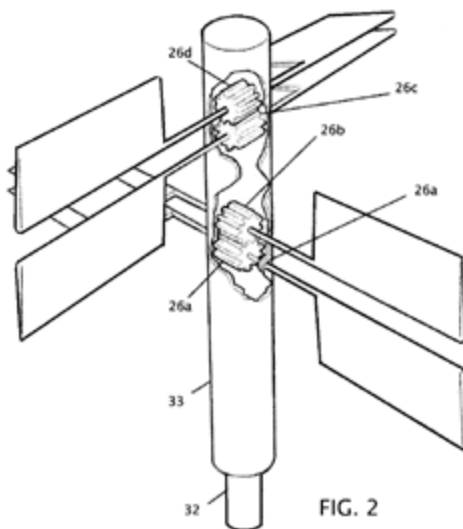
**Definition statement**

*This place covers:*

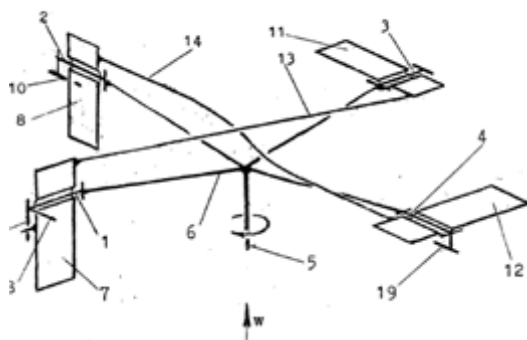
Wind motors whereby the cyclic movement of the wind engaging parts during each revolution of the rotor are forcibly and actively related to the rotor rotation, not the result of the action on the part by the wind flow itself .

Examples:

US2011091322



DE202008006980U



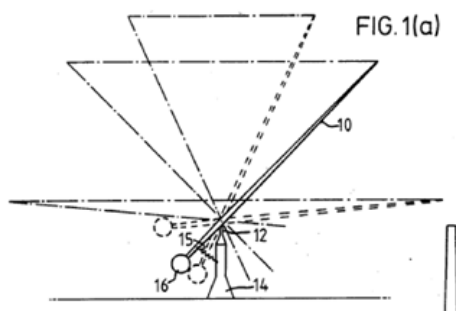
**F03D 5/00**Other wind motors (controlling thereof [F03D 7/00](#))**References****Limiting references***This place does not cover:*

Controlling of wind motors	<a href="#">F03D 7/00</a>
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**F03D 5/005****{Wind motors having a single vane which axis generate a conus or like surface}****Definition statement***This place covers:*Illustrated example of subject matter classified in [F03D 5/005](#).

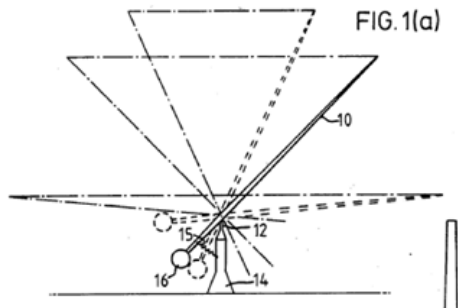
US4561826

U.S. Patent Dec. 31, 1985 Sheet 1 of 6 4,561,826

**F03D 5/02****the wind-engaging parts being attached to endless chains or the like****Definition statement***This place covers:*Illustrated example of subject matter classified in [F03D 5/02](#).

WO2010060911

U.S. Patent Dec. 31, 1985 Sheet 1 of 6 4,561,826



**F03D 5/04**

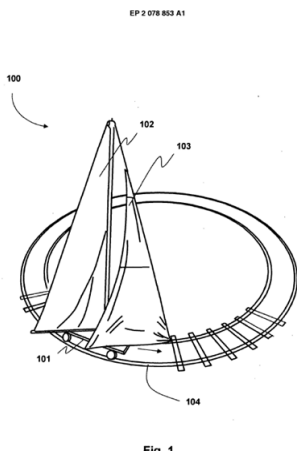
the wind-engaging parts being attached to carriages running on tracks or the like

**Definition statement**

*This place covers:*

Illustrated example of subject matter classified in [F03D 5/04](#).

EP078853



**F03D 5/06**

the wind-engaging parts swinging to-and-fro and not rotating

**Definition statement**

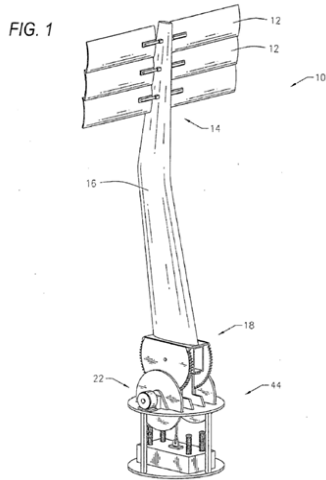
*This place covers:*

Illustrated example of subject matter classified in [F03D 5/06](#).



US2009/0224553

Patent Application Publication Sep. 10, 2009 Sheet 1 of 15 US 2009/0224553 A1



## F03D 7/00

### Controlling wind motors

#### Definition statement

*This place covers:*

Control of wind motors and related control arrangements.

[F03D 7/02](#) and [F03D 7/06](#) covers essentially the two main types of wind motors according groups [F03D 1/00](#) and [F03D 3/00](#). Main group [F03D 7/00](#) covers all other types of wind motors.

Subgroups [F03D 7/0204](#) - [F03D 7/0296](#) cover the purpose of the control or the type of control actuators. Subgroups under [F03D 7/04](#) cover the type of controllers and/or the control methods.

#### References

##### Limiting references

*This place does not cover:*

Supplying or distributing electric power	<a href="#">H02J</a>
Controlling electric generators	<a href="#">H02P</a>

##### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Controlling in general	<a href="#">G05B</a> , <a href="#">G05D</a>
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### Special rules of classification

Multi-aspect classification should be applied in this group. Documents should be classified in [F03D 7/02](#) for purpose of control or the type of controller and in addition according the control method or type of controller in group [F03D 7/04](#). For example, a model-based controller acting on the pitch system to reduce rotor noise should be classified in groups [F03D 7/045](#), [F03D 7/0224](#) and [F03D 7/0296](#).

## F03D 7/06

the wind motors having rotation axis substantially perpendicular to the air flow entering the rotor

### References

#### Informative references

Attention is drawn to the following places, which may be of interest for search:

Rotor construction, the wind engaging parts having a cyclic movement relative to the rotor during its rotation, the cyclic relative movement being coupled to the movement of rotation; Controlling same, e.g. according to wind direction or force	<a href="#">F03D 3/068</a>
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## F03D 9/00

Adaptations of wind motors for special use; Combinations of wind motors with apparatus driven thereby; Wind motors specially adapted for installation in particular locations (hybrid wind-photovoltaic energy systems for the generation of electric power [H02S 10/12](#))

### Definition statement

*This place covers:*

Adaptations of wind motors for special use, e.g. for converting solar radiation into useful energy by producing heat or for producing heat in heat pump systems;

Combinations of wind motors with water energy converters, e.g. water turbines;

Combinations of wind motors with apparatus driven thereby, e.g. pumps or compressors, electrical generators, heat pump systems or apparatus storing energy.

### References

#### Limiting references

*This place does not cover:*

Hybrid wind-photovoltaic energy systems for the generation of electric power	<a href="#">H02S 10/12</a>
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#### Application-oriented references

*Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:*

Arrangements in connection with vehicle propulsion units with power supply from wind	<a href="#">B60K 16/00</a>
Propulsion of ships or other waterborne vessels by wind motors driving water-engaging propulsive elements	<a href="#">B63H 13/00</a>
Pumps characterised by combination with wind motors	<a href="#">F04B 17/02</a>

**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Supplying or distributing electric power, Grid connection	<a href="#">H02J</a>
Systems for storing electric energy	<a href="#">H02J 15/00</a>
Structural association of electric generator and wind motor	<a href="#">H02K 7/18</a>

**F03D 9/20**

Wind motors characterised by the driven apparatus ([F03D 9/10](#) takes precedence)

**References****Limiting references**

This place does not cover:

Combinations of wind motors with apparatus storing energy	<a href="#">F03D 9/10</a>
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**Application-oriented references**

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

Arrangements of propulsion units in vehicles in connection with power supply derived from wind power	<a href="#">B60K 16/00</a>
Electric propulsion of vehicles using wind power	<a href="#">B60L 8/00</a>
Propulsion of ships or other waterborne vessels by wind motors driving water-engaging propulsive elements	<a href="#">B63H 13/00</a>
Driving auxiliaries on ships of other waterborne vessels using wind power	<a href="#">B63J 3/04</a>

**F03D 9/30**

Wind motors specially adapted for installation in particular locations (means for mounting or supporting wind motors [F03D 13/20](#))

**References****Limiting references**

This place does not cover:

Arrangements for mounting or supporting wind motors	<a href="#">F03D 13/20</a>
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**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Anchoring arrangements for special vessels	<a href="#">B63B 21/50</a>
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**F03D 9/32****on moving objects, e.g. vehicles****Definition statement***This place covers:*

Wind motors specially adapted for installation on moving objects, e.g. vehicles, in which the movement of the object causes air flow through the rotor.

**F03D 13/20****Arrangements for mounting or supporting wind motors; Masts or towers for wind motors****References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

Foundations for poles, masts or chimneys	<a href="#">E02D 27/42</a>
Towers; Masts, poles; Methods of erecting such structures	<a href="#">E04H 12/00</a>

**F03D 13/25****specially adapted for offshore installation****References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

Anchoring arrangements for special vessels	<a href="#">B63B 21/50</a>
Vessels or like floating structures adapted for special purposes	<a href="#">B63B 35/00</a>
Artificial islands mounted on piles or like supports	<a href="#">E02B 17/00</a>

**F03D 13/40****Arrangements or methods specially adapted for transporting wind motor components****References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

Vehicles adapted to transport or carry special loads or objects	<a href="#">B60P 3/00</a>
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## F03D 15/00

### Transmission of mechanical power

#### Definition statement

*This place covers:*

Transmission of mechanical power, i.e. mechanisms by which the wind-derived mechanical power is conveyed to its point of use

#### References

##### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Gearing	<a href="#">F16H</a>
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## F03D 15/20

### Gearless transmission, i.e. direct-drive

#### Glossary of terms

*In this place, the following terms or expressions are used with the meaning indicated:*

Direct-drive	Gearless transmission arrangement in which the rotor shaft is attached directly to the generator without intermediate gearing.
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## F03D 17/00

### Monitoring or testing of wind motors, e.g. diagnostics (testing during commissioning of wind motors [F03D 13/30](#))

#### Definition statement

*This place covers:*

Monitoring or testing of wind motors, e.g. diagnostics.

#### References

##### Limiting references

*This place does not cover:*

Testing during commissioning of wind motors	<a href="#">F03D 13/30</a>
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#### Glossary of terms

*In this place, the following terms or expressions are used with the meaning indicated:*

Monitoring or testing	Overseeing or analysing the operating conditions of the wind motor mechanism, typically to identify problematic conditions. This may involve reference to wind motor sensor signals indicating, e.g. wind speed and direction, pitch angle, vibration, rotary torque, blade load and strain.
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**F03D 80/10****Arrangements for warning air traffic****References****Informative references**

Attention is drawn to the following places, which may be of interest for search:

Traffic control systems for aircraft	<a href="#">G08G 5/00</a>
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**F03D 80/20****Arrangements for avoiding shadow flicker****Glossary of terms**

In this place, the following terms or expressions are used with the meaning indicated:

Shadow flicker	Periodic flickering effect due to repetitive shadows cast by rotating wind turbine blades.
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**F03D 80/30****Lightning protection****References****Informative references**

Attention is drawn to the following places, which may be of interest for search:

Installations of lightning conductors; Fastening thereof to supporting structure	<a href="#">H02G 13/00</a>
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**F03D 80/70****Bearing or lubricating arrangements****References****Informative references**

Attention is drawn to the following places, which may be of interest for search:

Lubricating of machines in general	<a href="#">F01M</a>
Bearings	<a href="#">F16C</a>

## F03D 80/80

### Arrangement of components within nacelles or towers

#### Glossary of terms

*In this place, the following terms or expressions are used with the meaning indicated:*

Nacelle	The protective outer housing enclosing wind motor components such as the transmission, associated gearing and turbine.
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