April 22, 1947. J. D. AULT 2,419,384

FLUID POWER WHEEL

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Fig. 1

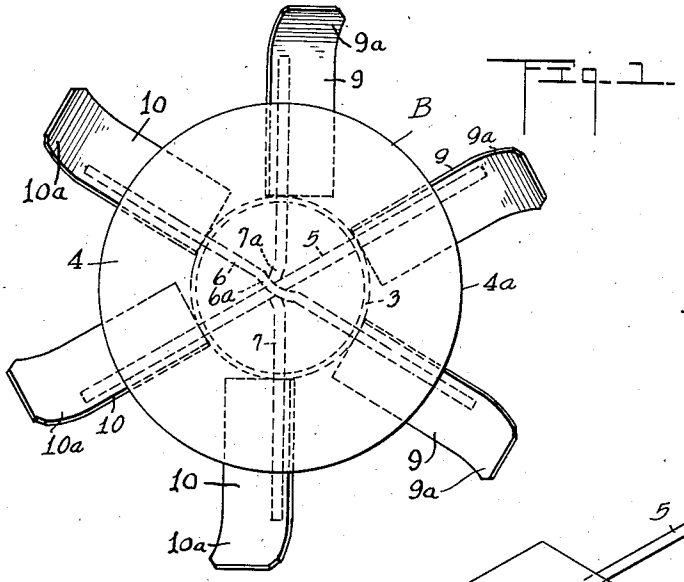


Fig. 4

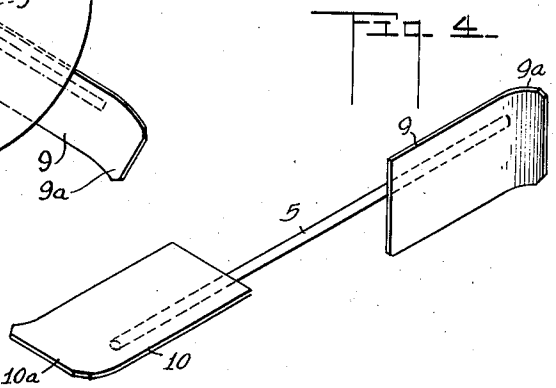


Fig. 2

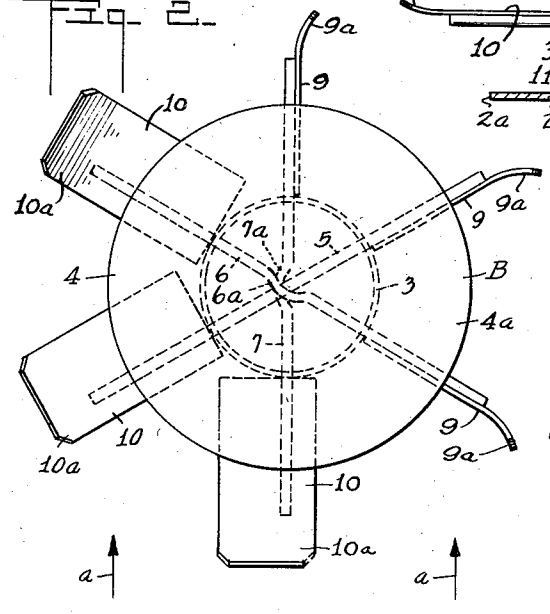
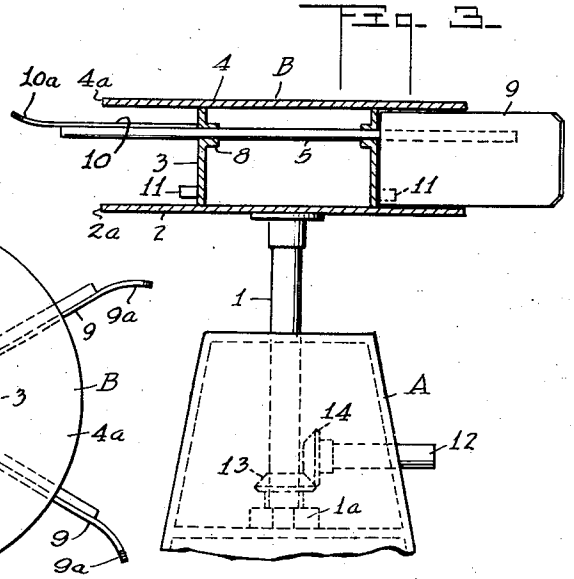


Fig. 3



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FLUID POWER WHEEL

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2 Claims. (Cl. 170—27)

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An object of my invention is to provide a fluid power wheel which is simple in construction and automatic in operation. The power wheel can be actuated by vapor, gas or liquid and the blades will be automatically swung into operative position by the fluid or liquid during the power stroke and will be automatically swung into a feathering position during the return stroke.

The fluid power wheel is designed to rotate about a vertical axis and the blades are arranged in pairs, each pair being mounted on a single blade shaft that extends diametrically across a drum. The blades in each pair are disposed at right angles to each other so that a moving of one blade into operative position for the power stroke will swing the other blade into a horizontal or feathering position for the return stroke. Stops limit further swinging of the blades when they reach a vertical position during the power stroke and this assures that the companion blades will be held in a horizontal or feathering position during the return stroke.

A further object of my invention is to provide a fluid power wheel wherein the parts are evenly balanced and wherein the blades cooperate with a central drum and upper and lower flanges to form air or water receiving pockets. The device can be used as a power unit for any purpose desired.

Other objects and advantages will appear in the following specification, and the novel features of the device will be particularly pointed out in the appended claims.

My invention is illustrated in the accompanying drawings forming a part of this application, in which:

Figure 1 is a top plan view of the device;

Figure 2 is a view similar to Figure 1 and shows how the blades react when subjected to a flow of gas or liquid;

Figure 3 is a transverse section through the power unit and shows it operatively applied to a driving shaft; and

Figure 4 is an isometric view of a pair of blades mounted on a single blade shaft.

While I have shown only the preferred forms of my invention, it should be understood that various changes or modifications may be made within the scope of the appended claims without departing from the spirit and scope of the invention.

In carrying out my invention I provide a base A, see Figure 3, which may be of any shape or construction desired. A vertical drive shaft 1 is rotatably mounted in the base on a thrust bearing 1a and supports the power unit indicated generally at B. The unit comprises a lower disc 2, a drum 3 and an upper disc 4. The diameters of the discs 2 and 4 are the same and they are larger than the diameter of the drum 3. This will cause the drum to have flanges 2a and 4a extending beyond its periphery.

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A plurality of horizontally disposed blade shafts 5, 6 and 7 are mounted in the periphery of the drum 3 and are rotatably supported by bearings 8. The blade shafts extend beyond the peripheries of the flanges 2a and 42 and have pairs of blades 9 and 10 rigidly secured thereto. The blade shaft 5 is shown in detail in Figure 4 and it will be seen that the blade 9 is secured to the shaft so that about two-thirds of the width of the blade will depend below the shaft when the blade 9 is in a vertical position, while one-third will extend above the shaft. The blade 9 is preferably rectangular in shape and has its outer end 9a curved in the manner shown. The blade 10 is similar to the blade 9 and when the blade 9 is in vertical position the blade 10 will be in a horizontal or feathering position. The blade 10 has a curved end 10a.

Figure 2 shows the shaft 5 extending diametrically across the drum 3. The shaft 6 lies in the same horizontal plane as the shaft 5 and has a central curved portion 6a that extends above the shaft 5 and permits the shaft 6 to swing through an arc of 90°. The blade shaft 7 has a curved portion 7a that extends under the shaft 5 and this curved portion will permit the shaft 7 to swing through an arc at 90°.

The drum carries stops 11 that hold the blades in a vertical position when they have been swung into this position by the fluid or liquid during the power stroke. When the blades are not subject to any pressure from a fluid, they will take the balanced position shown in Figure 1. As soon as any air or water moves toward the power unit as indicated by the arrows a in Figure 2, the blades on the right hand side of the unit will be swung downwardly so as to assume a vertical position, while the companion blades connected to the first named blades by the blade shafts will be swung into a horizontal or feathering position. Figure 3 illustrates how the blades when held in a vertical position by the stop pins 11 will completely fill the space between the flanges 2a and 4a. The vertical blades will cooperate with the flanges and with the drum for forming air receiving or water receiving pockets. The curvatures 9a of the blades will direct the air or water into the pockets when the blades assume the vertical position.

The other blades which are in a horizontal

position will offer practically no resistance to the air or water because they will be arranged in a horizontal plane and only the forward edges of the blades need cut through the flowing air or water stream. The result is that the power unit will be rotated in a counterclockwise direction when looking at Figure 2. The blades will be automatically rocked from a horizontal to a vertical position as they reach the right hand side of the power unit due to the fact that the blades have a tendency to drop into the angular balanced position shown in Figure 1 when freed and this is sufficient to cause the right hand blades to continue in their downward swinging movement when struck by air or water until they reach a vertical position. No cams or other mechanism need be used for swinging the blades. The stops 11 hold the blades from swinging beyond a vertical position.

The rotating unit will rotate the drive shaft 1 and this drive shaft may be used for delivering power to any means desired, such as to a driving shaft 12 which is connected to the drive shaft by bevel gears 13 and 14. The power unit will be substantially balanced because the blade shafts 5, 6 and 7 all lie in the same plane and all carry blades of equal area and shape. The automatic swinging of the blades provides a simple governor for regulating the speed of the device and prevents the power unit from rotating at too high a speed. The blades will rock from a horizontal to a vertical position at the start of the power stroke and therefore the entire length of the power stroke will be utilized for power purposes. The governor effect is due to the fact that the blade shafts are connected to the blades one third the distance down from the upper edges of the blades. There will be a tendency of each blade during its feathering position to swing into an inclined position and this will have a braking effect on the power unit B and thus act as a governor.

The size and number of the blades can be varied at will and the depth of the pockets formed by the flanges 2*a* and 4*a* can also be altered. The device is not only simple in its construction but simple in its operation. The thrust bearing shown at 1*a* in Figure 3 for the shaft 1 provides a main bearing support under the lower end and in the center of rotation of the drive shaft.

The blade ends are curved thereby using to advantage the aerodynamic characteristics of fluid in motion; i. e., that of exerting a force directed against a cord perpendicular to the radius of the curved surface by constant change of angular momentum. The curved blade ends 9*a* and 10*a* direct the air or water into the pockets formed by the blades and the flanges 2*a* and 4*a* when the blades are in vertical or operative position. The air or water is prevented from slipping laterally off the ends of the blades due to the blade curvatures and this results in greater power being developed. The blades of each pair are counter-balanced by the particular position of the blades on the blade shaft. By means of this arrangement, the automatic blade operation acts as its own governor to prevent excessive speed of the power unit. The placing of all blade shafts in the same horizontal plane provides an even and balanced application of power to the power unit. The fluid power wheel can be operated by water power as well as by wind.

I claim:

1. A fluid power wheel comprising a drum rotatable about a vertical axis and having upper and lower discs projecting beyond the drum periphery, horizontally disposed blade supporting shafts rotatably carried by the drum and extending diametrically thereacross, the shafts being disposed nearer the upper disc than the lower one and being angularly disposed with respect to one another in the horizontal plane, and blades secured to the portions of the shafts projecting beyond the drum, the two blades disposed on each shaft extending beyond the edges of the discs and being disposed at 90° with respect to one another so that when one is in a vertical position the other is in a feathering position, the blades when in vertical position extending between the upper and lower discs to cooperate therewith in forming a fluid receiving pocket, the greater portion of the blades extending from the shafts having a tendency to rock the shafts for inclining the blades from the horizontal, whereby the blades will be automatically rocked into operative and feathering positions as they are moved by the fluid pressure striking them, and stops for limiting the swing of the blades beyond a vertical plane.

2. A fluid power wheel comprising a drum rotatable about a vertical axis and having upper and lower discs projecting beyond the drum periphery, horizontally disposed blade supporting shafts rotatably carried by the drum and extending diametrically thereacross, the shafts being disposed nearer the upper disc than the lower one and being angularly disposed with respect to one another in the horizontal plane, and blades secured to the portions of the shafts projecting beyond the drum, the two blades disposed on each shaft extending beyond the edges of the discs and being disposed at 90° with respect to one another so that when one is in a vertical position the other is in a feathering position, the blades when in vertical position extending between the upper and lower discs to cooperate therewith in forming a fluid receiving pocket, the greater portion of the blades extending from the shafts having a tendency to rock the shafts for inclining the blades from the horizontal, whereby the blades will be automatically rocked into operative and feathering positions as they are moved by the fluid pressure striking them, and stops for limiting the swing of the blades beyond a vertical plane, the shafts lying in the same horizontal plane, certain of the shafts having central curved portions for clearing the other shafts at the drum center, the outer blade ends being curved for directing the fluid into the pockets when the blades are disposed in a vertical position.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
180,603	Leach	Aug. 1, 1876
185,924	Howland et al.	Jan. 2, 1877
1,753,302	Ramm	Apr. 8, 1930
2,099,617	Nelson	Nov. 16, 1937
325,366	Simpson	Sept. 1, 1885
1,516,668	Burch	Nov. 25, 1924

FOREIGN PATENTS

Number	Country	Date
582,734	French	Oct. 20, 1924