July 18, 1933. J. HAMMARSTROM 1,918,747

TOY WINDMILL

Filed Dec. 22, 1932

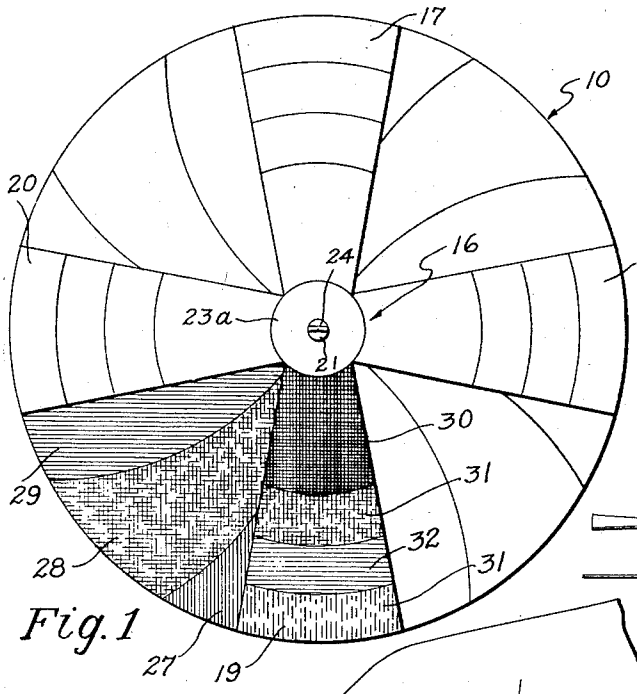


Fig. 1

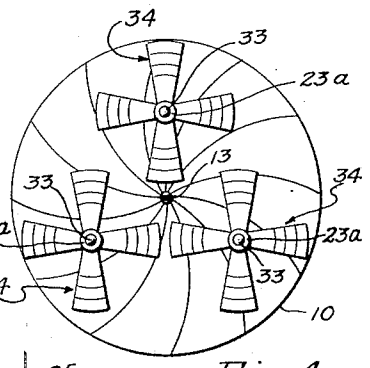


Fig. 4

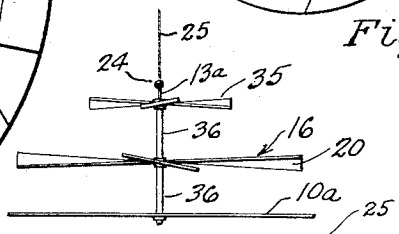


Fig. 6

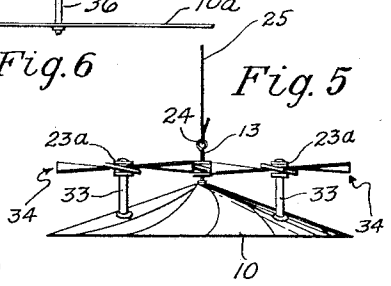


Fig. 5

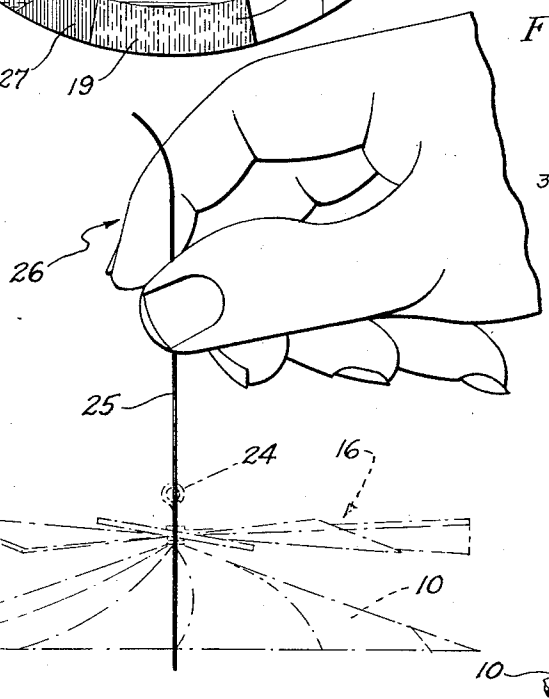


Fig. 2

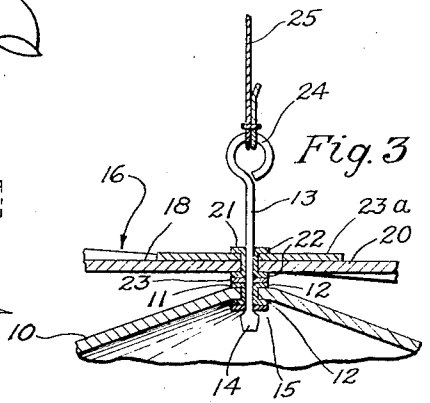
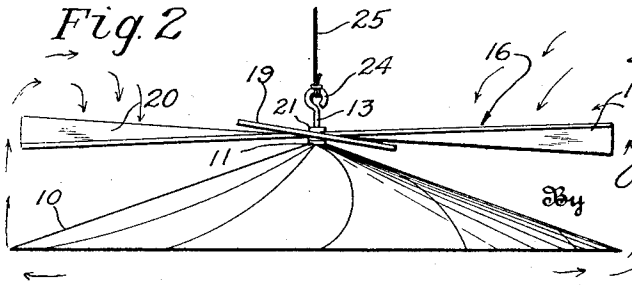


Fig. 3



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UNITED STATES PATENT OFFICE

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TOY WINDMILL

Application filed December 22, 1932. Serial No. 648,357.

This invention relates to new and useful improvements in toys and has particular relation to toy windmills.

An object of the invention is to provide a toy windmill so constructed that a reciprocating motion imparted to the toy results in a continuous rotary movement of a fan comprising a part of the toy.

Another object is to provide a toy windmill including a fan, a means whereby the fan may be given a reciprocating motion and a guard or deflector means reciprocable with and arranged at one side of the fan to deflect the air outwardly as the fan is moved in one direction, whereby as the fan is moved in one direction air impinging on one side of its blades or vanes causes it to rotate in one direction and in its movement in the opposite direction air is prevented from impinging on the other side of its vanes or blades whereby reciprocation of the toy results in the fan being given a continuous rotary movement.

A further object is to provide a toy of the kind indicated and wherein the operating or reciprocating means comprises a string adapted to be used to raise and lower the toy whereby the toy is reciprocated in a vertical direction.

An additional object is to provide an attractive toy windmill which may be suitably colored or ornamented and which comprises but a few parts and which may be manufactured and sold at a reasonable price.

Other objects and advantages will become apparent from a consideration of the following detailed description taken in connection with the accompanying drawing wherein satisfactory embodiments of the invention are shown. However, it will be understood that the invention is not limited to the details disclosed but includes all such variations and modifications as fall within the spirit of the invention and the scope of the appended claims.

In the drawing:

Fig. 1 is a top plan view of the toy, the operating means or string being omitted;

Fig. 2 is a side elevational view of the complete toy suggesting in broken lines the manner in which the same is operated;

Fig. 3 is a detail sectional view through the center portion of the toy on an enlarged scale;

Fig. 4 is a top plan view on a reduced scale showing a slightly modified arrangement;

Fig. 5 is a side elevational view of the toy as shown in Fig. 4; and

Fig. 6 shows a slight modification.

Referring in detail to the drawing and at first particularly to Figs. 1 through 3 thereof, the improved toy includes a shield or guard member 10, preferably in the form of a shallow cone having a bushing 11 extending through its apex, the said bushing including inner and outer flanges 12 between which the walls of the shield are clamped as clearly shown in Fig. 3. This guard member need not be a cone but may be substantially flat if desired, as shown at 10*a*, Fig. 6. This bushing may take the form of a hollow rivet or a grommet or the like and forms a reinforcing means and may also form a bearing means. Through the bushing 11 extends a wire or pin 13 flattened or otherwise enlarged at its inner end as at 14 and between this enlarged portion 14 and the bushing 11 a washer 15 may be interposed.

On the pin 13 above the shield or guard 11 a fan 16 is mounted and this fan as here shown includes four blades 17, 18, 19 and 20 which may be integral and pressed from a piece of cardboard or the like, if desired. The number of blades is not material and may be varied as desired. The blades may also be formed of sheet metal or other material depending on the price at which the device is to be sold and on other controlling or desirable considerations. Fan 16 also includes a hub or bushing 21 here shown as similar to the bushing 11 and including flanges 22 clamping the fan or the fan blades between them and this bushing 21 is disposed on the pin 13 above the shield or guard 10 and a washer 23 is shown as interposed between the two bushings. If desired, a relatively stiff strengthening disc 23*a* may be disposed centrally on the fan under the upper flange of the bushing 21.

It is to be understood that the fan 16 is rotatable on the pin 13 and the guard or shield 10 may be rotatable on said pin either with or

independently of the fan, or it may be stationary on the pin. At its outer end pin 13 is bent to form an eye 24 and to this eye is attached one end of a manipulating or operating string 25. In the operation of the device the string at a point spaced from the eye or hook 24 is held in the hand, as suggested by the hand indicated at 26 in Fig. 2, and the device is raised and lowered by the string as suggested by the broken lines in that figure. As the toy is moved upwardly air impinges on the top or upper sides of the vanes or fan blades and tends to set the fan in motion. As the toy moves downwardly the cone or shield 10 deflects the air outwardly so that it cannot impinge on the under sides of the fan blades or vanes. Therefore, the air does not tend to stop or reverse the direction of rotation of the fan as the toy is lowered. If the device is allowed to move downwardly at a fairly rapid rate air is deflected outwardly about the rim of the shield and comes inwardly due to reduced pressure above the shield and impinges on the top of the fan blades as indicated by the arrows in Fig. 2 thus providing an impulse to rotate the fan in its downward movement to assist that due to its upward movement.

The result is that successive impinging of the air on the top of the vanes soon sets the fan in motion and the fan is kept rotating as long as the up and down or reciprocating motion of the toy is continued. Should the guard or shield 10 be omitted the fan would not turn as the air impinging on the under side of the zanes or blades during lowering of the toy would tend to turn the fan in a direction opposite to that in which it is turned by the air impinging on the tops of the vanes. Therefore, without the shield or guard movement of the fan in one direction would tend to reverse any rotary movement imparted to the fan by its movement in the opposite direction and it will therefore be seen that when continuous rotary movement is to be imparted to the fan due to impinging of air on the fan blades, on reciprocation of the fan, means must be provided for shielding the fan during its movement in one direction.

The guard or shield may be suitably colored or ornamented on its upper surface and, of course, if desired, it may be colored or ornamented on its under surface. As here shown, the upper surface of the shield 10 is marked off into tapered spiral stripes, of which, of every three stripes, one may be red, one yellow and the other blue. This is as suggested at stripes 27, 28 and 29 in Fig. 1, the remaining portions of the guard in that figure being left plain although they are to be colored as above suggested.

Also, the upper surfaces of the fan blades may be colored as suggested for the fan blade 19 in Fig. 1. That is, each blade adjacent the hub or bushing 21 may be colored black as suggested at 30 on the blade 19 and then the blade may have a pair of spaced yellow stripes as at 31 between which it may have a blue stripe as at 32. Of course, any other suitable colors may be used or any other type of ornamentation may be used. When the fan rotates with sufficient rapidity the different colored portions of the different blades will produce the optical illusion of colored circles, the colored portions of the guard forming a background.

Referring now to Figs. 4 and 5, the windmill of these figures includes one of the shields or guards 10 through the apex or center of which extends the pin 13 having the loop or eye portion 24 to which is attached the manipulating string 25. At suitably spaced points, from the upper side of the convex side of the cone 10 there extends short pins or shafts 33 on the upper end portion of each of which is rotatably mounted a relatively small fan 34. These fans 34 may be of the same or substantially the same construction as the fan 16 described above, the outstanding difference being that the fans 34 are considerably smaller. It will be noted that the fans 34 are shown as spaced an equal distance apart and as each equi-distant from the pin 13 which marks the center of the cone shaped guard or shield altho they need not be so placed and may be placed any way desired so long as the device is balanced.

The windmill of Figs. 4 and 5 is operated in the same manner as the windmill first described and as the toy is raised and lowered, reciprocated in a vertical direction, the three fans 34 will be rotated. These fans are of such size as to not project substantially beyond the edges of the guard and the guard functions in connection with fans 34 in the same manner in which it functions with fan 16. Further, the fans 34 may as shown be of the four blade type although it will be understood that these fans as well as the fan 16 may contain a greater or lesser number of blades. It will be noted with relation to Fig. 4 that the fans 34 have their blades variously colored as suggested for the blades of fan 16 and the colored or ornamented guard or cone 10 will also form a background for the fans 34 of Figs. 4 and 5.

Another arrangement for a plurality of fans is shown in Fig. 6. Here an additional fan 35 is mounted above fan 16. The blades may be inclined as desired but it is preferred that they be inclined opposite to those of fan 16 so that the two fans will rotate in opposite directions and give a different optical effect. It is also preferred to make the upper fan smaller than the lower altho it need not necessarily be so. The fans may be separated by spacing sleeves 36 on the hanger 13*a*. Fans could also be mounted at each side of

the shield if desired to get the fan effect from both sides.

It is believed that the complete construction and operation of the improved toy will now be fully understood. The guard or shield 10 may be formed of any suitable material and for cheapness of construction is preferably formed of cardboard or heavy paper and may be impregnated with any suitable stiffening composition. This same is true of the blades of the fan or fans of the various figures and since the bushing 11 and 21 may be in the form of hollow rivets it will be understood that it may be easily and cheaply applied. Further, it will be understood that the improved windmill may be made with any desired number of fans and that the fans may be variously arranged to give different optical effects. Since the operating means or manipulating means is in the form of a piece of string it will be understood that when the toy is placed in a box or carton no provision need be made for disposition of the operating string since the latter may simply be dropped onto the fan.

The guard or shield 10 or 10*a* is illustrated on the drawing as being substantially circular and about the same size as the fan but it will be understood that it may be of any shape desired either for artistic effect or to indicate various articles. The relative size with respect to the fan may also vary and it may be either larger or smaller so long as it is of sufficient size to materially reduce the impinging of the air on one side of the fan blades.

Having thus set forth the nature of my invention, what I claim is:

1. In a toy windmill, a fan, means rotatably mounting said fan, a shield at one side of the fan to deflect air and prevent it impinging fully against the sides of the vanes of the fan adjacent said shield on movement of the shield and fan in one direction, and means to reciprocate the shield and fan together.

2. In a toy windmill, a fan, means rotatably mounting said fan, a shield at the inner side of said fan, said fan and shield mounted to be reciprocated as a unit, means to reciprocate said fan and shield, and said shield adapted to prevent air freely impinging upon the inner sides of the blades of the fan while the fan and shield are moving in one direction.

3. In a toy windmill, a shield, a pin extending from said shield, a fan rotatably mounted on said pin at one side of said shield, means for imparting a reciprocating movement to the shield and fan, and said shield of a diameter to materially reduce impinging of air on the sides of the blades of the fan adjacent the shield during movement of the toy in one direction.

4. In a toy windmill, a shield, a pin extending from said shield, a fan rotatably mounted on said pin at one side of the shield, a string connected with said shield for raising and lowering the same to impart a reciprocating movement to the shield and fan, and said shield of a diameter to materially reduce impinging of air on the sides of the blades of the fan adjacent the shield during movement of the toy in one direction.

5. In a toy windmill, a shield comprising a cone shaped member, a fan at the convex side of said shield, means to reciprocate the shield and fan together, and said shield of a diameter to deflect air and prevent it impinging fully against the sides of the blades of the fan adjacent the shield.

6. In a toy windmill, a shield, a pin extending from said shield, a fan rotatably mounted on said pin at one side of said shield, means connected with said shield for imparting a reciprocating movement to the shield and fan, said pin of a length to permit of movement of the fan along the pin relative to the shield, and said shield of a diameter to materially reduce impinging of air on the sides of the fan blades adjacent the shield during movement of the toy in one direction.

7. In a toy windmill, a shield, a pin extending from said shield and on which the shield is rotatably mounted, a fan rotatably mounted on said pin at one side of said shield and for turning movement independent of the shield, a means connected with said pin for imparting a reciprocating movement to said shield and fan, and said shield of a diameter at least substantially as great as that of the fan whereby the shield will materially reduce impinging of air on the sides of the blades of the fan adjacent the shield during movement of the toy in one direction.

8. In a toy windmill, a fan, means rotatably mounting said fan, a shield at the inner side of said fan and of substantially the diameter of the fan, said fan and shield mounted to be reciprocated as a unit, a string connected with said shield for raising and lowering the same whereby to reciprocate the shield and fan, and said shield of a diameter to materially reduce impinging of air on the inner sides of the fan blades on movement of the toy in one direction.

9. In a toy windmill, a shield, means for reciprocating said shield, a plurality of fans, means rotatably mounting said fans at one side of said shield, and said fans of such diameter that they are disposed substantially entirely within the area defined by the edges of said shield, whereby on movement of the toy in one direction the shield will materially reduce impinging of air on the blades of the fans.

10. In a toy windmill, a shield, a string connected with the central portion of said shield for raising and lowering the same, a plurality of fans, means spaced about the center of said shield and rotatably mounting said fans on the shield at one side thereof, and said fans of

such diameter that the greater portions of them are disposed substantially entirely within the area defined by the edges of said shield whereby on movement of the toy in one direction the shield will prevent free access of the air to the undersides of the blades of the fans.

11. In a toy windmill, a shield, a pin extending centrally from said shield, a fan rotatably mounted on said pin at one side of said shield, a string connected with said pin for raising and lowering the shield and fan to impart a reciprocating movement thereto, and said shield of a diameter sufficiently great as to shield and greatly reduce air impinging on the sides of the blades of the fan adjacent the shield during movement of the toy in one direction.

12. In a toy windmill, a shield, means for reciprocating said shield, a plurality of fans, means rotatably mounting said fans at one side of the shield and arranged one above the other with their blades inclined in opposite directions, whereby on movement of the toy in one direction the shield will materially reduce impinging of air on the blades of the fan.

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