Feb. 23, 1971 J. E. CRONIN ETAL 3,564,917

MAXIMUM AIR SPEED INDICATOR

Filed July 25, 1968

Fig. 1.

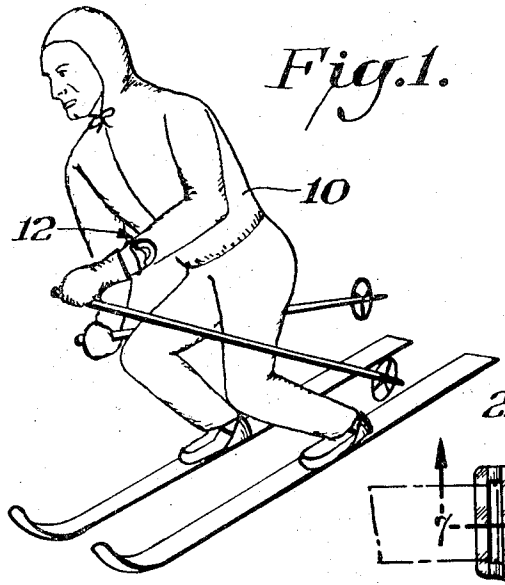



Fig. 3.

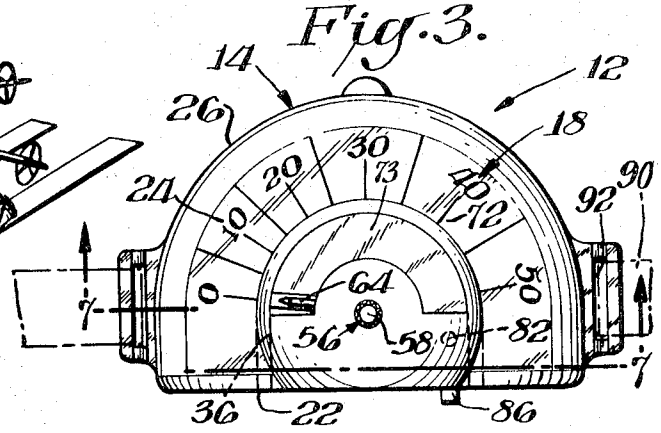



Fig. 4.

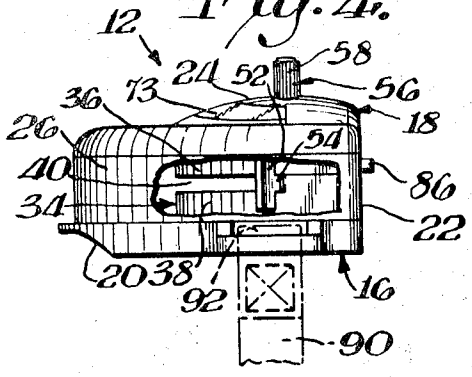



Fig. 2.

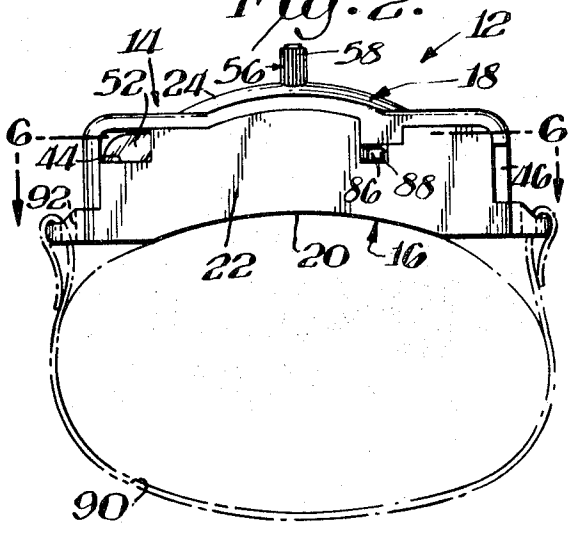



Fig. 6.

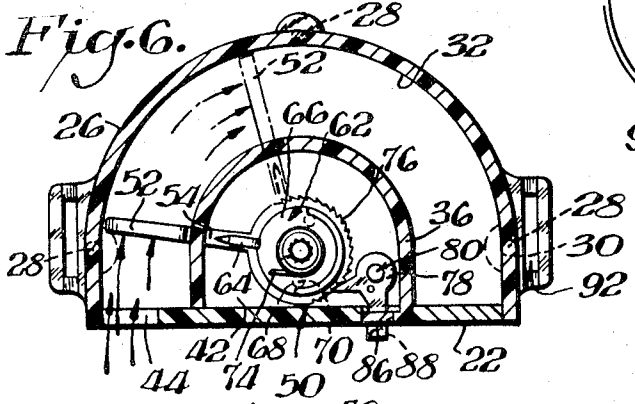



Fig. 7.

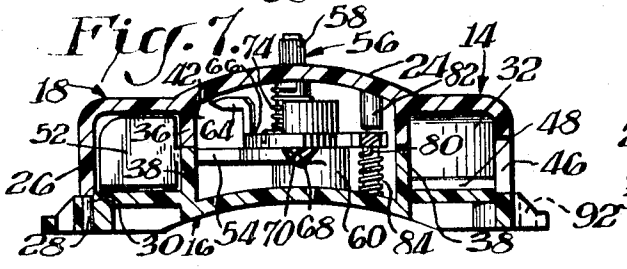
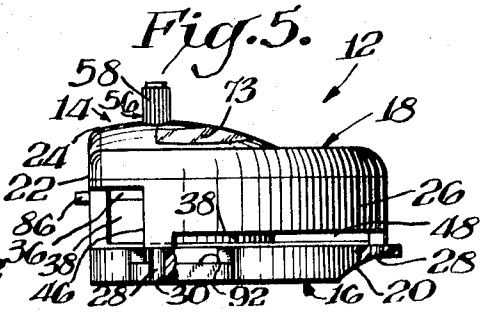



Fig. 5.



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3,564,917

# MAXIMUM AIR SPEED INDICATOR

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U.S. Cl. 73—228 2 Claims

## ABSTRACT OF THE DISCLOSURE

Speedometer comprises case having arcuate air passageway and inner chamber with slot between passageway and chamber. Air openings on case communicate with passageway. Paddle assembly in case includes paddle blade in passageway, arm connected to paddle blade extending therefrom through slot to pivotal connection in chamber, and indicator needle connected for movement with arm paddle blade. Biasing device urges paddle assembly in direction opposite to direction of air flow through passageway. Ratchet mechanism includes teeth connected for movement with paddle assembly and pawl in releasable engagement with teeth arranged to hold paddle assembly at point of maximum swing when air flowing through passageway swings paddle blade against force of biasing device.

## BACKGROUND OF THE INVENTION

The present invention relates to a speed indicating device, and more particularly to a speedometer for skiers.

Prior to the present invention numerous devices have been proposed for measuring speed. Many of these devices such as the type disclosed in Cramer Pat. 2,793,528, granted May 28, 1957, utilize a paddle or vane and the force of air acting thereon to determine the speed of the device relative to the velocity of the air flowing around it. However, for the most part, the prior art devices are characterized by their complex modes of operation as well as the numerous components required to construct them.

Accordingly, it is an object of the present invention to provide a speedometer having relatively few parts which operates in a highly successful and trouble-free manner.

## SUMMARY OF THE INVENTION

In accordance with the present invention a speedometer comprises a case having an arcuate air passageway therein and an inner chamber. A slot is provided between the passageway and the chamber as well as air inlet and outlet openings on the case that communicate with the passageway. A paddle assembly in the case includes a paddle blade in the passageway, an arm connected to the paddle blade extending therefrom through the slot to a pivotal connection in the chamber, and an indicator needle connected for movement with the arm and the paddle blade. A biasing device urges the paddle assembly in a direction opposite to the direction of air flow through the passageway. A ratchet mechanism has teeth connected for movement with the paddle assembly and a pawl in releasable engagement with the teeth is arranged to hold the paddle assembly at its point of maximum swing when air flowing through the passageway swings the paddle blade against the force of the biasing device.

The speedometer case may include top and bottom surfaces with an upwardly extending wall between the surfaces. Moreover, the air inlet and outlet openings may be disposed in the upstanding wall of the case. The passageway may extend approximately 180° and the air outlet openings may include an arcuate opening that extends approximately 90°.

The pivotal connection of the paddle assembly comprises a rotatable post having a head portion that extends through the case. The biasing device is connected between



the post and the paddle assembly so that selected rotation of the post adjusts the force of the biasing device acting on the paddle assembly. The biasing device can be a torsion spring wrapped around the post with one end of the spring engaging the post and the other end connected to the paddle assembly.

Additionally, the paddle assembly may include a counterweight connected to the arm on the side of the pivotal connection opposite the paddle blade. Also, the speedometer case may include an arcuate indicia-carrying panel adjacent the swing of the indicator needle for correlating the position of the needle with speed. The speedometer case may further include straps connected thereto for securing the speedometer in the position of its intended use.

## BRIEF DESCRIPTION OF THE DRAWING

Novel features and advantages of the present invention will become apparent to one skilled in the art from a reading of the following detailed description in conjunction with the accompanying drawing wherein similar reference characters refer to similar parts and in which:

FIG. 1 is a pictorial view of a skier wearing a speedometer according to the present invention;

FIG. 2 is a front elevational view of a speedometer according to the present invention;

FIG. 3 is a top plan view of the speedometer shown in FIG. 2;

FIG. 4 is a left side elevational view of the speedometer shown in FIGS. 2 and 3;

FIG. 5 is a right side elevational view of the speedometer shown in FIGS. 2 and 3;

FIG. 6 is a sectional view taken along line 6—6 of FIG. 2; and

FIG. 7 is a sectional view taken along line 7—7 of FIG. 3.

## DETAILED DESCRIPTION OF THE INVENTION

Referring in more particularity to the drawing, FIG. 1 illustrates a skier **10** wearing a speedometer **12** according to the present invention. The speedometer is releasably secured to the body of the skier, such as the forearm, for example, and functions in the manner described below to indicate the speed of the skier during his descent. The speedometer **12** comprises a case **14** with a lower part **16** and an upper part **18**. The lower part has a bottom surface **20** and an upstanding front wall **22** while the upper part **18** has a top surface **24** with a downwardly extending side wall **26**. The upper and lower parts of the case **14** are maintained in assembled relationship by pins **28** on one part that frictionally engage holes **30** on the other part.

As shown best in FIG. 6, an arcuate air passageway **32** is provided inside the case. The passageway is formed in part by the side wall **26** and an inner wall **34** formed by arcuate wall segments **36, 38** on the upper and lower parts of the case **14**. The arcuate wall segments **36, 38** are spaced from one another so that a slotted opening **40** is defined between them. The case **14** also has an inner chamber **42** which communicates with the arcuate air passageway **32** through the slotted opening **40**. An air inlet **44** is provided in the front wall **22** of the speedometer case. Air outlets are also provided in the case at the end of the arcuate air passageway opposite air inlet **44**. One of the air outlets comprises a rectangular shaped opening **46** in the side wall **26** of the case while the other outlet comprises a slotted opening **48** in the side wall which opening extends approximately 90°. As explained more fully below, the air outlets function to relieve back pressure within the arcuate air passageway **32** during operation of the speedometer.

A paddle assembly **50** is located inside the speedometer case **14** for measuring and indicating the speed of the

person using the speedometer **12**. The assembly comprises a paddle blade **52** located inside the arcuate air passageway **32**. An arm **54** connected to the paddle blade **52** extends from the blade through the slotted opening **40** formed by the arcuate wall segments **36**, **38** to a pivotal connection in the chamber **42**. The pivotal connection comprises a rotatable post **56** having a head portion **58** that extends through an opening in the top surface **24** of the upper case part **18**. The base of the post is frictionally maintained within a recess in the bottom surface of the case and operates in a manner explained more fully below. For the purpose of pivotally attaching the arm **54** inside the chamber **42**, the post **56** loosely extends through an opening in the arm at the end of the arm opposite the paddle blade. The arm and paddle blade are thus free to rotate about the post. The arm **54** also carries a counterweight **60** on the side of the post opposite the paddle blade **52**. The counterweight serves to offset the weight of the paddle blade so that the arm and paddle blade are balanced on the post.

The paddle assembly **50** also includes an indicator needle **62** connected to the arm **54** for movement therewith. The needle has a pointer portion **64** connected to a circular base **66**. The base has a central opening through which the post **56** passes. The underside of the base carries a pair of lugs **68** that enter openings **70** in the arm **54** to position and anchor the indicator needle with respect to the arm **54** and the paddle blade. Accordingly, as the paddle blade and arm move the indicator needle moves with them. The pointer portion **64** of the indicator needle **62** is located adjacent an arcuate indicia-carrying panel or speed scale **72** comprising numbers printed or embossed on the top surface **24** of the upper case part **14** with the numbers of the scale arranged to accurately indicate speed. The pointer portion **64** is visible throughout its full swing through an arcuate window **73** in the case part **14**.

A biasing device in the form of a torsion spring **74** urges the paddle assembly **50** in a direction opposite to the direction of air flow through the arcuate passageway **32**. The torsion spring **74** is wrapped around the post in the space between the indicator needle **62** and the top surface **24** of the speedometer case **14**. One end of the spring is secured to the post and the other end is anchored to the circular base **66** of the indicator needle. Thus, as can readily be understood, rotation of the post **56** through manipulation of the head **58** varies the tension of the torsion spring. With the torsion spring oriented as best shown in FIG. 7 rotation of the post in a counterclockwise direction increases the force the spring exerts upon the paddle assembly in a direction opposite to the direction of air flow through the passageway **32**. Thus, the speedometer **12** is readily adjusted or calibrated by increasing or decreasing the tension of the spring **74**. With a calibrating source of constant velocity of 40 m.p.h., for example, one can set the tension of the torsion spring so that the paddle blade **52** swings the indicator needle **62** to the number **40** on the indicia-carrying panel **72**.

The speedometer **12** of the present invention also includes a ratchet mechanism for holding the paddle assembly at its point of maximum swing whereby the maximum speed of the skier during his descent is registered. The ratchet mechanism includes teeth **76** that extend over a portion of the circumference of the circular base **66** of the indicator needle **62**. The ratchet mechanism further includes a pawl **78** in releasable engagement with the teeth **76** on the circular base of the indicator needle. The pawl is rotatably mounted on the upper end of a stationary post **80** connected to the bottom surface of the speedometer case **14**. Movement of the pawl in an upward direction is prevented by a downwardly extending projection **82** on the top surface of the speedometer case, as best shown in FIG. 7. The pawl **78** is biased into engagement with the teeth **76** of the ratchet mechanism by a torsion spring **84**. The spring **84** is secured at one end



to the pawl, and at its other end to the bottom surface **20** of the speedometer case. When the pawl **78** is arranged as shown in FIG. 6, the teeth **76** are inclined in a counterclockwise direction. Accordingly, as the paddle assembly **50** moves in a clockwise direction under the influence of air striking the paddle blade **52** the teeth slide past the pawl. However, when the paddle assembly starts to move in a counterclockwise direction under the influence of the torsion spring **74** the pawl engages the teeth to prevent such movement. The pawl also has a handle portion **86** that extends through an opening **88** in the front wall **22** of the speedometer case. The speedometer is reset by moving the handle to the right as viewed in FIGS. 2 and 6. Such movement moves the pawl out of engagement with the teeth whereby the torsion spring **74** is free to return the paddle assembly to its starting position where the pointer portion **64** indicates zero velocity or speed.

In use, the speedometer **12** of the present invention is secured to the body of the skier **10** by a flexible strap **90** threaded through slotted openings **92** on the speedometer case **14**. The speedometer is positioned so that the front wall **22** faces the direction of air flow. As can readily be understood, air enters the air inlet **44** in the front wall **22** of the case. The air exerts a force on the paddle blade **52** which causes the blade to move within the arcuate air passageway **32** against the force of the torsion spring **74**. The spring **74** is tensioned so that the force of air on the paddle blade is correlated with the relative speed of the skier. The air outlets including the opening **46** and the arcuate slot **48** function to relieve pressure on the back side of the paddle blade **52** during its swinging movement. With these openings the relationship between the force of the torsion spring **74** and the force of the air acting on the paddle blade **52** is maintained throughout the full swing of the paddle blade. As mentioned above, as the paddle blade moves the indicator needle **62** moves with it and the pointer portion **64** indicates the speed of the skier wearing the speedometer. Moreover, as the paddle assembly swings, the teeth of the ratchet mechanism slide past the pawl **78**. However, after the blade reaches its point of maximum swing the paddle assembly **50** is prevented from movement in the opposite direction by engagement of the pawl **78** with the teeth **76**. Resetting the speedometer to zero conditions is accomplished by moving the pawl out of engagement with the teeth, as explained above.

We claim:

**1.** A speedometer comprising a case having an arcuate air passageway therein and an inner chamber, a slot between the passageway and the chamber, air inlet and outlet openings in the case communicating with the arcuate passageway, the air outlet opening including an arcuate opening extending some distance along said case and communicating with the passageway, said arcuate opening functioning to progressively relieve pressure on the back side of the paddle blade as it travels along the passageway, a paddle assembly in the case including a paddle blade in the arcuate passageway, an arm connected to the paddle blade extending therefrom through the slot to a pivotal connection in the inner chamber, and an indicator needle connected for movement with the arm and the paddle blade, biasing means urging the paddle assembly in a direction opposite to the direction of air flow through the arcuate passageway, and a ratchet mechanism including teeth connected for movement with the paddle assembly and a pawl in releasable engagement with the teeth arranged to hold the paddle assembly at its point of maximum swing when air flowing through the arcuate passageway swings the paddle blade against the force of the biasing means.

**2.** A speedometer as in claim **1** wherein the arcuate air passageway extends approximately 180° and the arcuate opening in the case communicating with the arcuate passageway extends approximately 90°.

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U.S. Cl. X.R.

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