United States Patent [19]

Doyle et al.

[11] **3,899,843**

[45] **Aug. 19, 1975**

[54] **SIGNALLING DEVICE WITH A SIGN HAVING PROVISION FOR SPILLING OF WIND AND WITH A SUPPORT**

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[22] Filed: **May 8, 1969**

[21] Appl. No.: **830,908**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 689,514, Dec. 11, 1967, abandoned.

[52] **U.S. Cl.** ..... **40/125 G**; 40/125 N; 116/63 P; 160/351

[51] **Int. Cl.** **G09f 07/18**

[58] **Field of Search** ..... 40/125 R, 125 N, 125 F, 40/125 G, 125 H, 128, 129 C, 129 R, 145 A; 116/63 R, 63 P; 160/351

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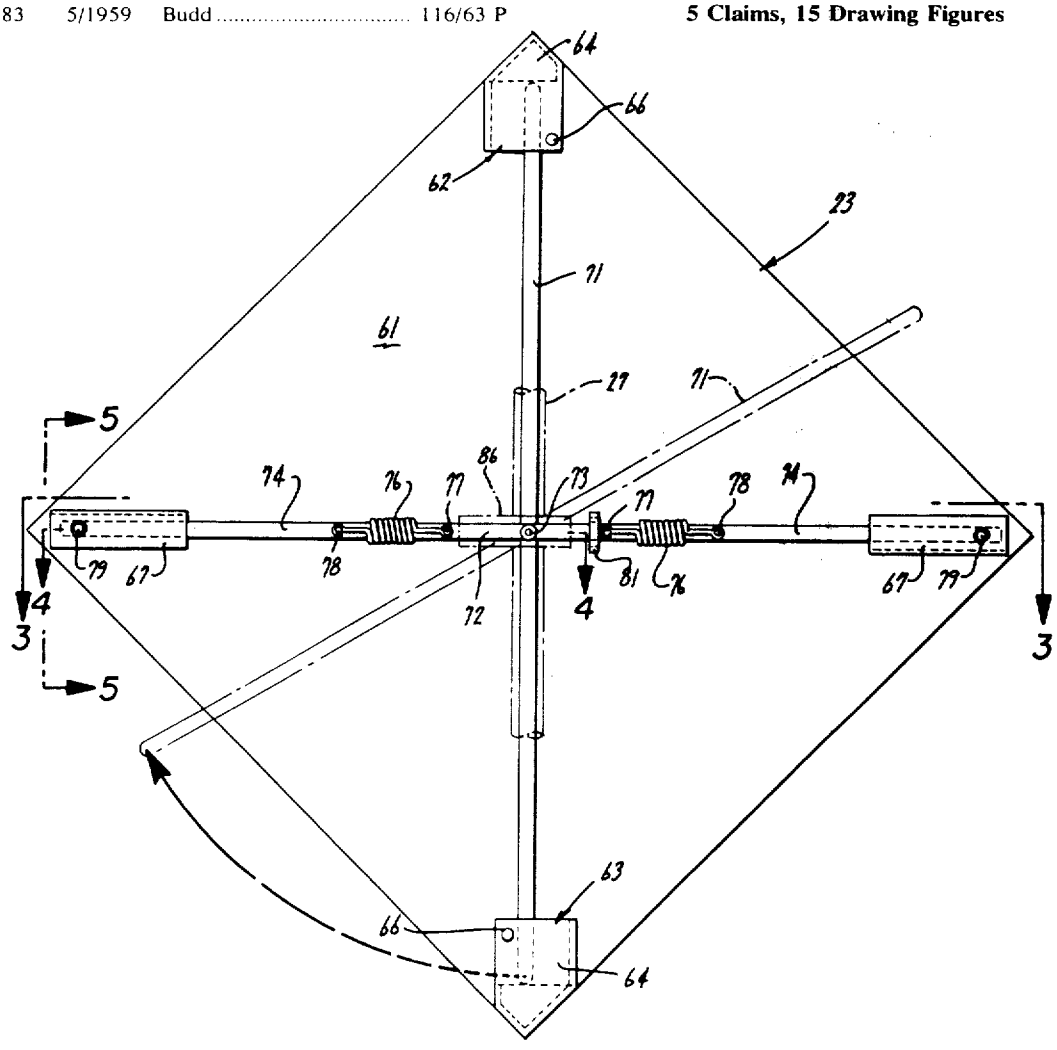
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[57] **ABSTRACT**

Signalling device comprising a sign and a support with the sign being formed of flexible material and having rigid extension arms which are yieldably urged into position for supporting the sign and which will bend with a predetermined wind load on the sign to facilitate spilling of the wind past the sign. Means is provided which will prevent bending of the sign beyond a predetermined amount when wind is being spilled by the sign. The support has an eccentrically mounted cam for retaining the support stand in an erected position. The stand also includes pin and slot means for preventing rotation of the telescoping parts of the stand. A bracket having swivel mounted jaws is provided for fastening the sign to the telescoping members.

5 Claims, 15 Drawing Figures



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SHEET 1 OF 4

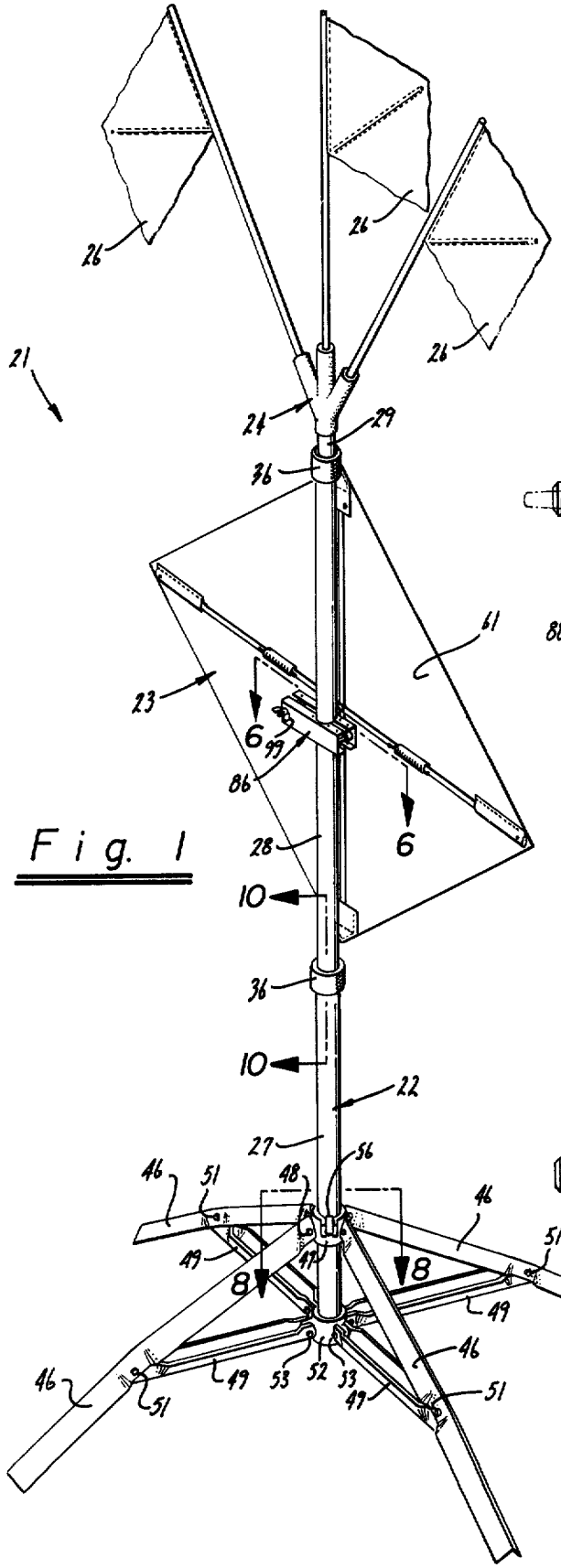


Fig. 1

Fig. 6

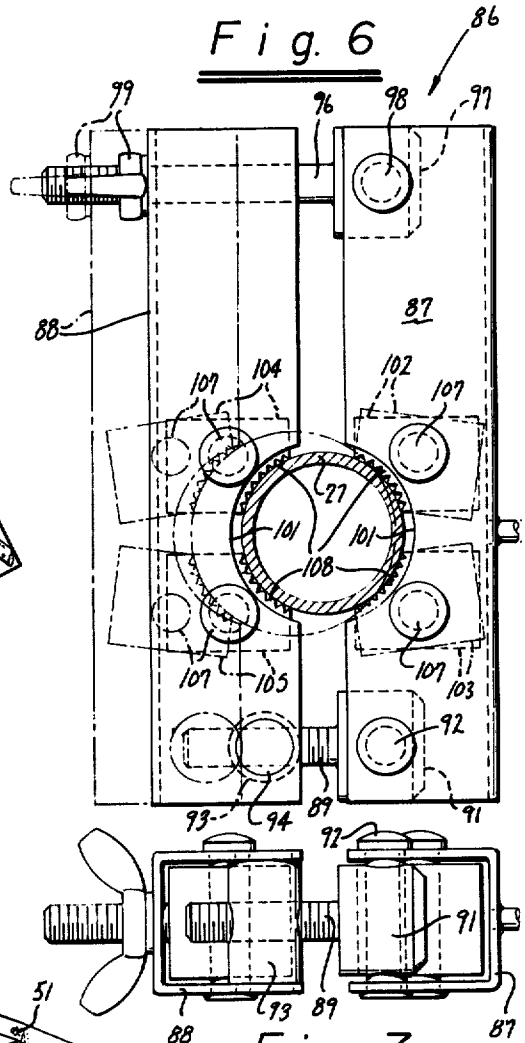


Fig. 7

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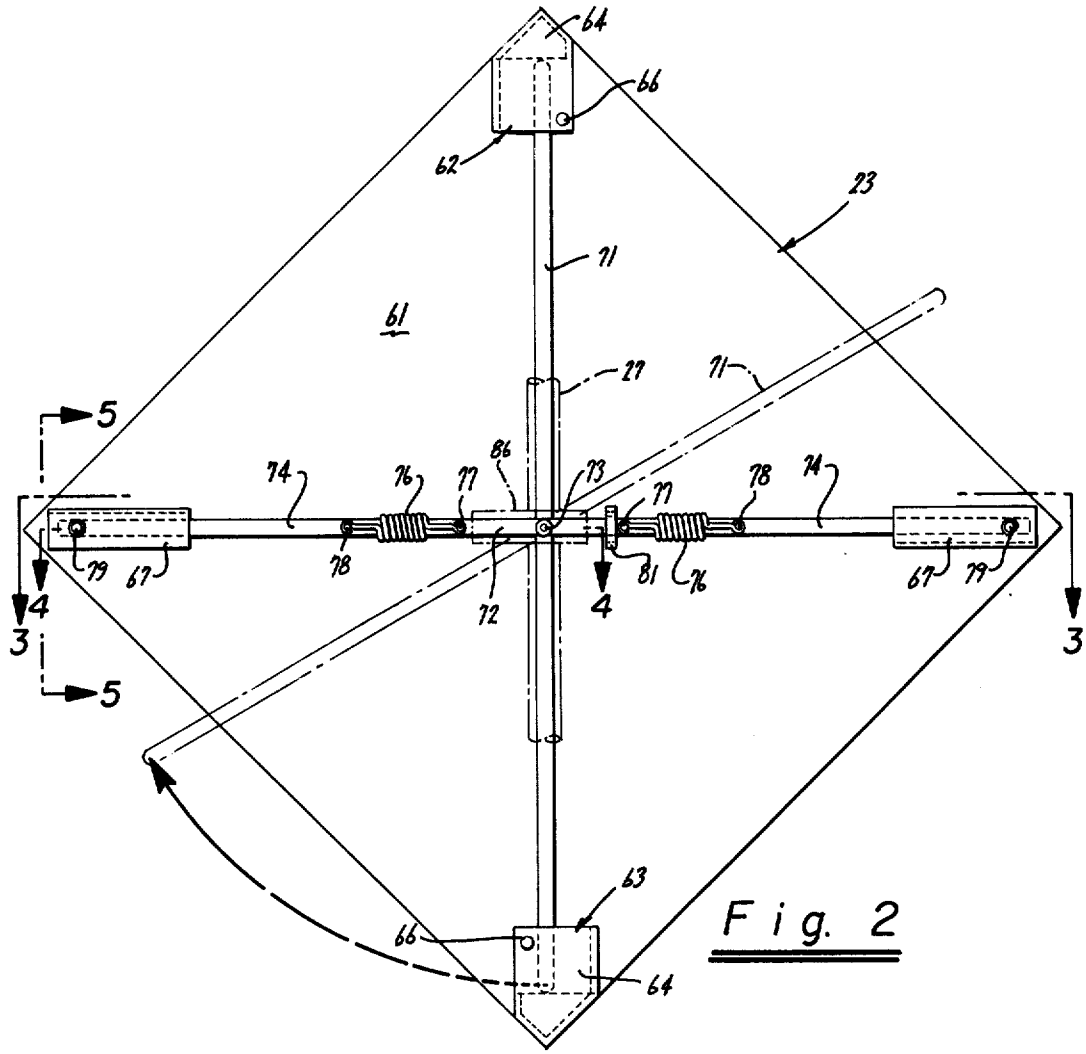


Fig. 2

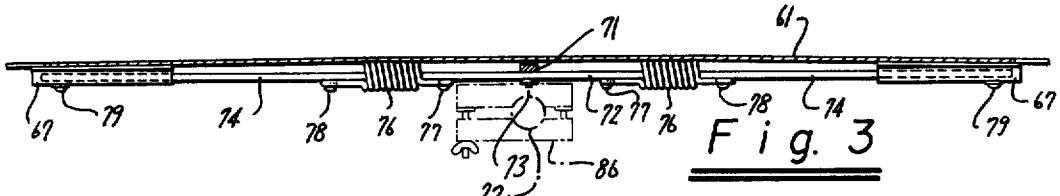


Fig. 3

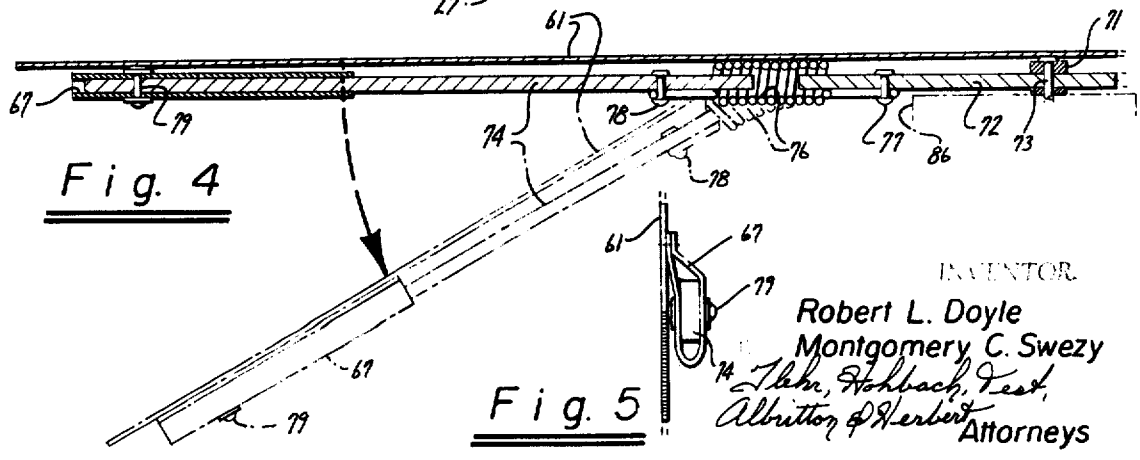


Fig. 4

Fig. 5

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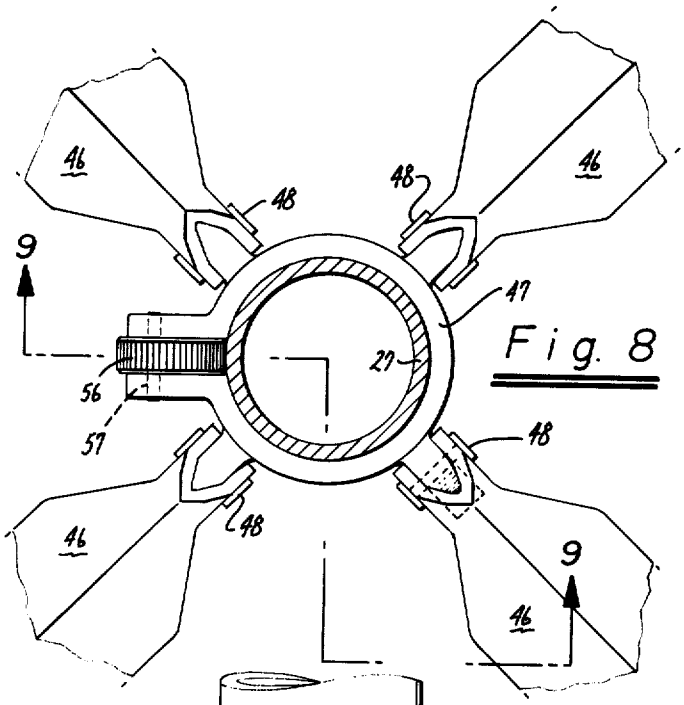


Fig. 8

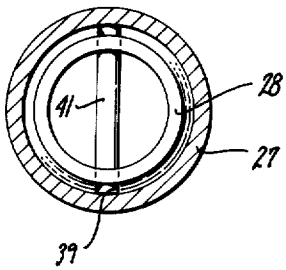


Fig. 11

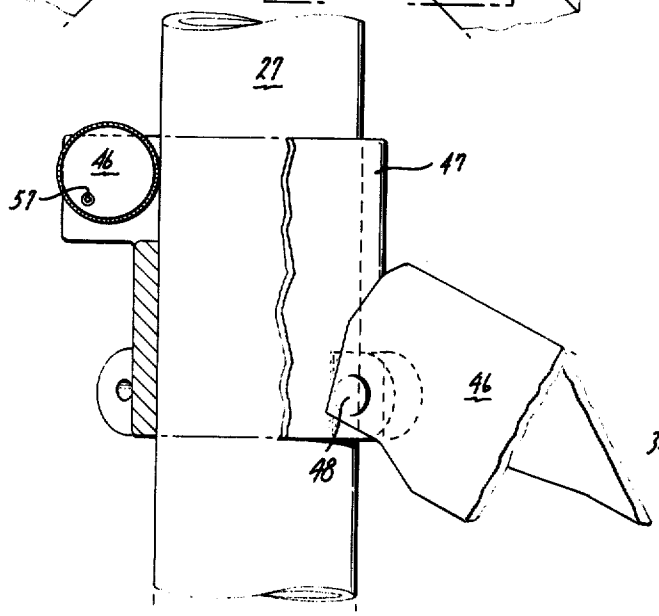


Fig. 9

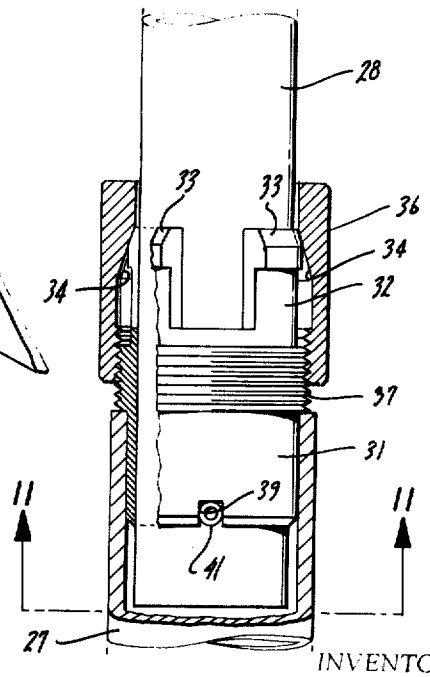


Fig. 10

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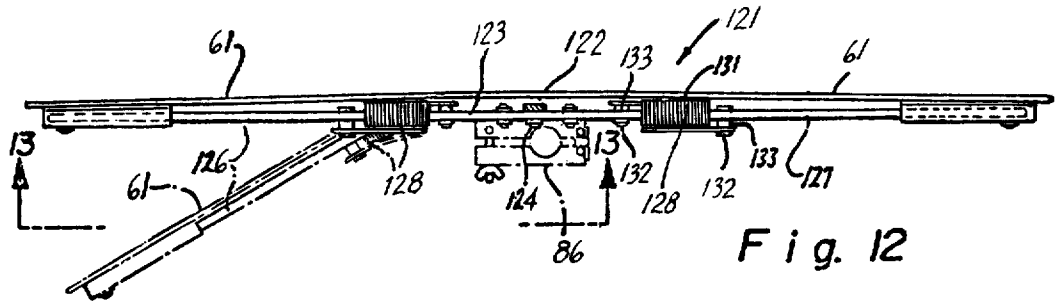


Fig. 12

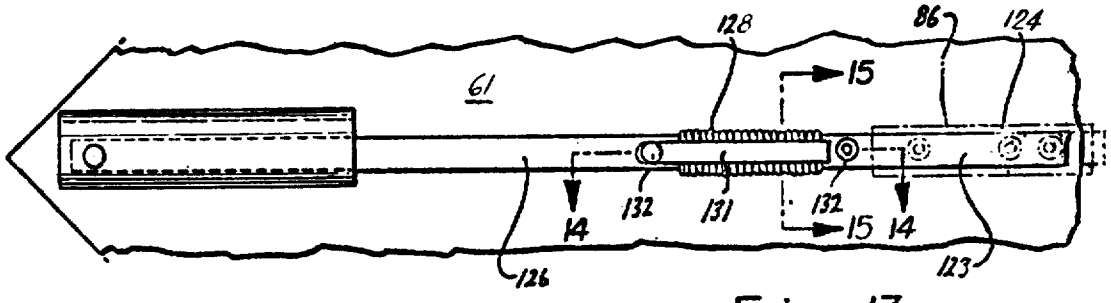


Fig. 13

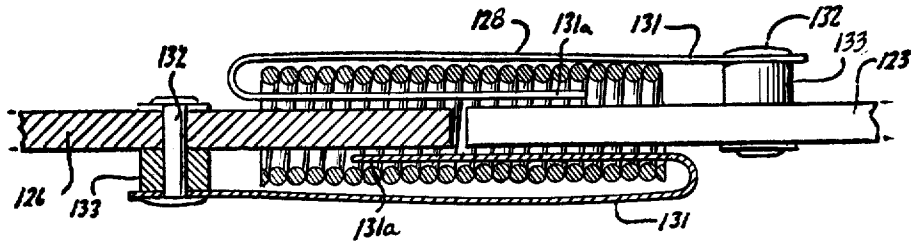


Fig. 14

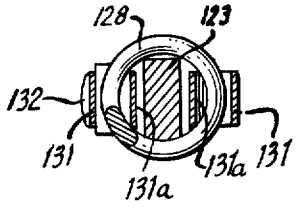


Fig. 15

SIGNALLING DEVICE WITH A SIGN HAVING PROVISION FOR SPILLING OF WIND AND WITH A SUPPORT

CROSS REFERENCE TO RELATED APPLICATION

This application is a continuation-in-part of application Ser. No. 689,514, filed Dec. 11, 1967, now abandoned.

BACKGROUND OF THE INVENTION

In U.S. Pat. No. 3,200,786 there is disclosed a signalling device which has been found to be particularly effective. However, it has been found that the signalling device may blow over in high winds encountered on construction projects, particularly in certain geographical areas. This is particularly true when the large diamond-shaped 48 inches × 48 inches signs are utilized which are required on many Federal highway programs. There is, therefore, a need for a new and improved signalling device.

SUMMARY OF INVENTION AND OBJECTS

The signalling device includes a sign with a support stand. The sign is formed of a flexible sheet-like member. At least one arm is provided that is formed of a rigid material. In addition, an extension arm, also formed of rigid material, is provided. Yieldable spring means is provided for mounting the extension arm on the first named arm and serves to normally retain said additional extension arm in alignment with said first named arm. Means is provided for securing the sheet-like member to said first named arm and said additional extension arm so that the sheet-like member is maintained in a relatively taut condition. When a predetermined wind load is placed on the sign, the spring means yields to permit bending of the sign and to facilitate spilling of wind past the sign. Means is provided on the sign for preventing bending of the sign beyond a predetermined amount when it is spilling wind. The support stand has telescoping members. Means is provided on the telescoping members for preventing rotation of the sign when it is mounted thereon.

In general, it is the object of the present invention to provide a signalling device which has a sign having provisions for spilling of the wind.

Another object of the invention is to provide a signalling device of the above character in which the arms provided for maintaining the sign in a relatively taut condition are provided with yieldable spring means to permit bending of the sign to facilitate spilling of the wind past the sign.

Another object of the invention is to provide a signalling device in which means is provided for preventing bending of portions of the sign beyond a predetermined angle from a normal position when wind is being spilled by the sign.

Another object of the invention is to provide a signalling device of the above character in which the support stand is provided with means for preventing the stand from collapsing as it is rocked back and forth in the wind.

Another object of the invention is to provide a signalling device in which the support stand includes telescoping members and in which means is provided for preventing rotation of the telescoping member which has the sign fastened thereto.

Another object of the invention is to provide a signalling device of the above character in which the clamp utilized for securing the sign to the support stand includes pivotally mounted jaws to facilitate gripping of telescoping members of various sizes.

Additional objects and features of the invention will appear from the following description in which the preferred embodiment is set forth in detail in conjunction with the accompanying drawing.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a perspective view of a signalling device incorporating the present invention.

FIG. 2 is an enlarged rear elevational view of the sign shown in FIG. 1.

FIG. 3 is a cross-sectional view taken along the line 3—3 of FIG. 2.

FIG. 4 is an enlarged cross-sectional view taken along the line 4—4 of FIG. 2.

FIG. 5 is a cross-sectional view looking along the line 5—5 of FIG. 2.

FIG. 6 is a cross-sectional view looking along the line 6—6 of FIG. 1 and particularly shows the clamp utilized for securing the sign to the support stand.

FIG. 7 is an end elevational view of the clamp shown in FIG. 6.

FIG. 8 is a cross-sectional view taken along the line 8—8 of FIG. 1.

FIG. 9 is a cross-sectional view taken along the line 9—9 of FIG. 8.

FIG. 10 is a cross-sectional view taken along the line 10—10 of FIG. 1.

FIG. 11 is a cross-sectional view taken along the line 11—11 of FIG. 10.

FIG. 12 is a cross-sectional view similar to FIG. 3 showing another embodiment of a sign incorporating the present invention.

FIG. 13 is a partial rear elevational view of the sign shown in FIG. 12.

FIG. 14 is a cross-sectional view taken along the line 14—14 of FIG. 13.

FIG. 15 is a cross-sectional view taken along the line 15—15 of FIG. 13.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The signalling device 21 constituting the present invention consists of a support stand 22 with the sign 23 mounted thereon. A yoke 24 is also mounted upon the support stand and carries a plurality of warning flags 26.

The support stand 22 has three telescoping sections 27, 28 and 29 in which section 27 is the lower section. The intermediate section 28 telescopes into section 27 and the top section 29 telescopes into the intermediate section 28. The lower section 27 and the intermediate section 28 are both provided with collets 31 (see FIG. 10) which are mounted by suitable means such as a press fit in the section. The collets are provided with deformable extensions 32 having inclined surfaces 33 adapted to be engaged by inclined surfaces 34 carried by knurled ferrules 36 threaded onto threads 37 provided intermediate the ends of the collets 31. It can be readily seen that by tightening the ferrule 36, the tube which telescopes therein can be held in any desired elevated position by frictional engagement between the collet and the tube or section.

Means is provided for preventing rotation of the intermediate section **28** with respect to the lower section **27** and takes the form of a pin and slot means in which slots **39** are formed in the lower extremity of the collet **31** mounted in the upper end of the lower section **27** and a pin **41** is mounted on the lower extremity of the intermediate section or tube **28.**

In use, the section **28** is extended as far as possible so that the pin **41** engages the lower extremity of the collet **31** and thereafter, the section **28** is rotated while at the same time lifting the same until the pin **41** seats within the slots **39** provided in the collet. Then while holding section **28** in this position, the ferrule **36** is tightened to retain section **28** in this extreme extended position with the pin **41** seated in the slots **39.** When the intermediate section **28** is positioned in this manner, it can be seen that the intermediate section **28** cannot rotate with respect to the section **27** for the purpose hereinafter described.

The support stand also includes four legs **46** which are formed of a suitable material such as angle iron. The legs are pivotally connected to a collar **47** by rivets **48.** The collar **47** is slidably mounted upon the lower section **27.** Braces **49** are pivotally connected to intermediate portions of the legs **46** by rivets **51** and are also connected to a collar **52** affixed to the lower extremity of the lower section **27** by rivets **53.** With the construction shown, it can be seen that the legs **46** can be collapsed so that they extend generally parallel to the lower section **27** merely by sliding the collar **47** upwardly on the lower section **27.**

Means is provided for preventing the collar **47** from sliding upwardly on the tube **27** and consists of a knurled circular member or cam **56** which is mounted upon a pin **57.** The cam **56** is disposed between a pair of spaced parallel ears provided on the collar **47** and pin **57** is mounted in the ears. It will be noted from FIG. **8** that the knurling extends in a direction which is parallel to the axis of the cam. As can be seen particularly from FIGS. **8** and **9,** the cam is adapted to engage the lowermost section **27** and when in engagement therewith prevents the collar **47** from riding up on the lower section **27.** It is only when the cam **56** is pivoted out of engagement with the lower section **27** that the collar can be moved upwardly to collapse the legs **46.**

The sign **23** consists of a flexible member or sheet **61** formed of a suitable material such as a heavy canvas coated with plastic or the like. The sheet can be formed in the general manner described in U.S. Pat. No. 3,200,786 and can bear indicia on its front side. It also can have the configuration described in U.S. Pat. No. 3,200,786, namely rectangular or diamond-shaped as shown in FIG. **1.** Pockets **62** and **63** are formed on the upper and lower corners on the back side of the sheet or member **61** of the type also described in U.S. Pat. No. 3,200,786. As described therein, the pockets can be formed by sewing additional pieces **64** of material to the rear of the sign by sewing on one side and the upper extremity of the same to the sheet **61** to provide a pocket which is open on one side. A snap **66** is provided for fastening the other side of each pocket so that only one side of the pocket is open. Additional pockets **67** are formed on the two other corners of the sheet **61** by taking pieces of material and folding them over and sewing the ends together and to the corners of the sheet **61.**

Means is provided for retaining the sheet or member **61** in a relatively taut condition and consists of a pair of arms **71** and **72** which are pivotally interconnected to each other intermediate the ends of the same by suitable means such as a rivet **73.** As can be seen from FIGS. **2, 3** and **4,** the arm **72** is relatively short in comparison to the arm **71.** Additional extension arms **74** are provided for mounting on the opposite ends of the arm **72.** The arms **71** and **72** and the extension arm **74** are all formed of a suitable rigid material such as steel. Yieldable means is provided for mounting the extension arms **74** on the arm **72** so that the extension arms are maintained in alignment with the arm **72** and consists of coil springs **76** in the form of right cylinders which have one end of the same fixed to the arm **72** by a rivet **77** and the other end of the same affixed to the extension arm **74** by a rivet **78.** As can be seen, particularly in FIG. **4,** the ends of the arm **72** and the inner ends of the extension arms **74** extend into the coil springs **76.** In this manner, the coil springs **76** serve to normally retain the extension arms **74** in alignment with the arm **72.**

The springs **76** are constructed so that they will yield when a predetermined pressure is applied to the arms **74** as, for example, a force of **36** pounds applied to the ends of the extension arms **74** will cause the springs **76** to permit the arms **74** to be bent relative to the arm **72.** The extension arms **74** are secured in the pockets **67** by rivets **79.** Thus, it can be seen that the arm **72** with the extension arms **74** are permanently secured to corners of the sheet-like member **61** to retain it in a taut condition. A loop **81** is sewn to the rear side of the sheet-like member and overlies the arm **72** and keeps the center of the sheet-like member in relatively close proximity to the arm **72.** The arm **71** is adapted to be removed and inserted in the pockets **62** and **63** and is adapted to be moved to a position which is in line with the arm **72** and the extension arms **74** so that thereafter the sheet-like member **61** can be rolled about the arms.

A clamp **86** is secured to the sign **23** and is provided for removably affixing the sign to the support stand **22.** The clamp **86** consists of first and second U-shaped parts **87** and **88.** The two parts **87** and **88** are pivotally interconnected by a screw **89** which has as its head **91** pivotally mounted in the part **87** by a rivet **92.** The screw **89** threads into a nut **93** pivotally mounted in the part **88** by a rivet **94.** The other ends of the parts **87** and **88** are adapted to be interconnected by a screw **96** which has its head **97** pivotally mounted in the part **87** by a rivet **98.** A wing nut **99** is threaded onto bolt **96** and is adapted to engage the part **88** through which bolt **96** extends. The parts **87** and **88** are provided with arcuate recesses **101** intermediate the ends of the same which are slightly larger than the size of the tubular member which is to be grasped. A plurality of four jaw-like members **102, 103, 104** and **105** are provided with two of the jaw-like members being pivotally mounted at spaced points adjacent the arcuate openings **101** by rivets **107.** Each of the jaws is provided with serrated arcuate surfaces **108** which are adapted to engage the tubular section **28.**

Use of the signalling device may now be briefly described as follows. In placement of the signalling device, the support stand **22** is first erected by lifting the lower section **27** upwardly to permit the legs **46** to open outwardly under force of gravity. As soon as the collar **47** has been moved to its lowermost position, the ec-

centrically mounted member **56** is raised upwardly and moved into engagement with the section **27** to prevent the collar **47** from slipping upwardly on the section **27**. Thereafter, the intermediate section **28** is raised until the pin **47** strikes the lowermost extremity of the collet **31**. The section **28** is then rotated until the pin **47** comes into engagement with the slots **39** in the collet **31**, and thereafter the ferrule **36** is tightened to cause the collet **31** to frictionally engage the intermediate section **28**. The top section **29** is then raised and secured in the desired position by the ferrule **36** mounted on the upper end of the intermediate section **28**. Means for preventing rotation is not provided for the top section because the sign **23** is mounted on the intermediate section **28**. The yoke **24** can be mounted at the top of section **29** and the flags **26** put in place.

Thereafter, the sign **23** can be unrolled and then the arm **71** can be rotated relative to the arm **72** and positioned within the pockets **62** and **63** and the snaps **66** closed. All four corners of the sheet-like member **61** are now engaged by the arms which serve to retain the sheet-like member **61** in a relatively taut condition.

The sign is now ready to be clamped onto the support stand. The parts **87** and **88** are opened up by loosening the wing nut **99** and swinging the wing nut out of the way. Thereafter, the open parts **87** and **88** are slipped over the intermediate section **28** so that intermediate section **28** is seated within the recesses provided by the jaw **102–105**. The bolt **96** is then swung into position and the wing nut tightened so that the jaws **102–105** firmly grip the section **28**. It has been found that since the jaws **102–105** are pivotally mounted within the parts **87** and **88**, they are able to accommodate telescoping sections of various sizes and still firmly grip the same. The serrations provided in the jaws prevent rotation of the sign relative to the intermediate section **28**. As hereinbefore pointed out, the section **28** cannot rotate with respect to the bottom section **27** because of the pin and slot connection provided.

Let it be assumed that the signalling device has been placed in a location where a substantial wind is encountered. When the wind exerts pressure on either or both sides of the sign which exceeds a predetermined maximum amount as, for example, a wind velocity which places a force on the extension arms **74** which is greater than a predetermined amount as, for example, **30** to **36** pounds, the sides of the sign will bend to facilitate spilling of the wind past the sign. As shown in FIG. **4**, this bending occurs when either or both of the springs **76** yield. As soon as the force applied by the wind drops below the predetermined amount, the sides of the sign **23** will immediately spring back to their normal position in which the front surface of the sheet-like member **61** is substantially planar. Thus, it can be seen that the springs **76** serve to provide means which permit bending of the sign to facilitate spilling of the wind.

This is very advantageous because this makes it possible to utilize the signalling device in very windy locations without any danger of it being tipped over by the wind. It has been found that this feature greatly enhances the stability of the device. Because of the locking features hereinbefore provided, the sign **23** does not turn. In addition, the cam **56** prevents the collar **47** from accidentally moving upwardly as, for example, when the signalling device is being rocked by the wind to decrease the stability of the signalling device.

By way of example, it was found that a signalling device constructed in accordance with the present invention having a sheet-like member measuring 48 inches × 48 inches was able to withstand a wind velocity of over 35 miles per hour without any difficulty. It has been found that the springs which prevent bending of the extension arms **74** with respect to the arm **72** readily permit spilling of sufficient wind so that the device can be utilized in windy locations.

Another embodiment of a sign **121** similar to the sign **23** is shown in FIGS. **12–15** in which a flexible member or sheet **61** substantially identical to that hereinbefore described is utilized. The means which is provided for retaining the sheet or member **61** in a relatively taut condition consists of a pair of rigid arms **122** and **123** which are pivotally interconnected to each other intermediate the ends of the same by suitable means such as a rivet **124**. The arm **123** is relatively short in comparison to **122**. Additional extension arms **126** and **127** are provided for mounting on opposite ends of the arm **123**. The arms **122** and **123**, as well as the extension arms **126** and **127**, are formed of a suitable rigid material such as steel. Yieldable means is provided for mounting the extension arms **126** and **127** on the opposite ends of the arm **123** and to maintain them in alignment with the arm **123** and consists of a pair of coil springs **128**. As can be seen particularly from FIG. **14**, the coil springs **128** have a substantial length and have an internal diameter so that the outer end of the arm **123** and one end of the associated extension arm as, for example, extension arm **126**, can be positioned within the coil spring **128** in such a manner that the extension arm **126** is held in alignment with the arm **123**. As shown particularly in FIG. **14**, the coil spring **128** has an inner diameter which is only sufficiently great so that the largest cross-sectional dimension of the arm **126** will slidably fit within and frictionally engage the coil spring **128** so that the extension arm **126** will not wobble substantially within the coil spring **128** and so that the extension arm **126** will extend in a direction which is in axial alignment with the arm **123**. Thus, this slip fit provided between the coil spring **128** and the associated extension arm take the place of other forms of interconnecting the parts as hereinbefore previously described. As also hereinbefore previously described, the coil springs **128** permit the outer portion of the sign carried by the extension arms **128** to spill wind from the sign in the event there is a heavy wind prevailing.

Means is provided for preventing the portions of the sign carried by the extension arms **126** and **127** from bending beyond a predetermined angle from the normal when they are spilling wind from the sign. In FIGS. **12–15**, such means takes the form of straps or strap-like members **131** formed of a suitable material such as spring steel. The straps **131** are bent generally into a U-shaped configuration in which one leg portion **131a** extends into one end of the coil spring **128** adjacent one side of the coil spring **128** as shown particularly in FIG. **15**. As also to be noted in FIG. **15**, there is sufficient space between the coil spring **128** and the arms mounted thereon to accommodate the member **131**. One member **131** is secured to the arm **126** by suitable means such as a rivet **132** and a spacer **133**. Thus, it can be seen that one end of this member **131** is secured to the arm **126** disposed in one end of the coil spring **128**, whereas the other end of the strap-like member **131** ex-

tends into the coil spring **128** from the end opposite the end which is adjacent the rivet **132.**

In a similar member, the other strap-like member **131** has one portion **131***a* disposed in the other end of the spring **128** and has its other end secured to a rivet **132** and a spacer **133** of the type hereinbefore described so that the two members **131** are disposed on opposite sides of the arm **123.** In addition, it should be noted that the strap-like members **131** enter the spring **128** in opposite directions and are secured by the rivets **132** to the two arms which extend into the spring **128** as, for example, the arms **123** and **126.**

Use of the sign shown in FIGS. **12–15** in conjunction with the signalling device may now be described as follows. Let it be assumed that a sign **121** such as that shown in FIGS. **12–15** has been mounted upon a support stand of the type hereinbefore described. The sign **121** is provided with a clamp **86** which is adapted to be secured to a support stand by the use of the clamp **86.**

In the event that the sign is placed in a windy location, portions of the sign carried by the additional extension arms **126** will be bent rearwardly as soon as the force of the wind overcomes the yieldable force of the coil springs **128** to thereby permit spilling of the wind from the sign.

It has been found that with the embodiment shown in FIGS. **1–11** that there is a tendency for such signs, particularly in strong winds, to bend so far that it is difficult, if not impossible, for an oncoming motorist to read the sign. This undesirable feature is overcome by the straps **131** which are U-shaped and which have the bottoms of the ends of the coil springs spaced a slight distance away from the extremities of the associated coil spring so that limited movement of the outer portion of the sign can occur with respect to the remaining portions of the sign. Thus, the strap-like members **131** can be formed to permit the desired angular movement of the outer extension arms **126** and **127** away from the normal plane for the sign. This will thus permit spilling of the wind by the sign so that the sign will not be blown over and which will also limit the bending so that the sign can be read by motorists or other persons facing the sign from a distance. The length of the strap-like members **131** can be chosen so that different angles of bending or tilting of the extension arms **126** and **127** can be accommodated before movement is restrained by the strap-like members **131** engaging the ends of the coil spring **128** as shown in broken lines in FIGS. **12** and **14.** The strap-like members **131** will also bend as the coil spring **128** is being bent, while at the same time limiting further movement of the extension arm with respect to the arm **122** when the bottoms of the U-shaped portions of the strap-like members engage the ends of the coil spring **128.**

The foregoing construction which is shown in FIGS. **12–15** makes it possible to construct a sign which will still readily spill wind so that the sign will not be blown over when it is mounted upon a support stand and positioned in a strong wind. The strap-like members **131** which serve to limit the amount of tilting or bending of the portions of the sign which are spilling the wind thus serve to ensure that the portions which are spilling the wind remain at an angle so that it still is readily visible to an oncoming motorist.

It has been found that even though the tilting of the portions of the sign which spill the wind is limited to a certain angle, this does not appreciably affect in any way the ability of the sign to stand up in very strong winds when it is mounted upon a support stand. By way of example, it has been found that a sign measuring 48 inches × 48 inches mounted upon a support stand and in which the portions which spill wind from the sign were limited to an angle of approximately 30° from the normal plane of the sign, was still able to withstand wind velocities well over **35** miles per hour without tipping over.

It is apparent from the foregoing that there has been provided a signalling device of greatly improved characteristics particularly suitable for use in windy conditions and which is still readily visible at all times to an oncoming motorist during windy conditions. In addition, there is no tendency for the signaling device to tip over, nor is there a tendency for the sign to turn on the support stand. The sign cannot rotate because of the construction of the clamp and also because of the very simple pin and slot connection provided with the telescoping sections.

We claim:

1. In a signalling device, a flexible sheet-like member, first and second arms, means pivotally interconnecting said first and second arms intermediate the ends of the same, said second arm having a length substantially less than the length of said first arm, first and second extension arms, means yieldably mounting said first and second extension arms on said second arm so that said first and second extension arms are normally disposed in alignment with said second arm, and means securing said sheet-like member to said first arm and to said first and second extension arms to support said sheet-like member in a relatively taut condition and so that at least portions of the sheet-like member are carried by the extension arms, said yieldable means permitting bending of portions of the sheet-like member when a predetermined wind load is placed on the sheet-like member to permit spilling of wind by the sheet-like member.

2. A signalling device as in claim **1** wherein said yieldable means includes a coil spring in the form of a right cylinder mounted on the outer ends of the second arm and mounted on the inner ends of the extension arms.

3. A signalling device as in claim **1** wherein said yieldable means includes means for preventing bending of the yieldable means beyond a predetermined angle.

4. A signalling device as in claim **1** wherein said yieldable means consists of first and second coil springs in the form of right cylinders, said first and second coil springs being mounted on the outer ends of the second arm and serving to carry the inner ends of the extension arms so that the extension arms are maintained in alignment with said second arm, first and second strap-like members mounted on the outer ends of said second arm and having hook-like portions adapted to engage the ends of the spring remote from the outer ends of said second arm, and third and fourth flexible members secured to the inner ends of the extension arms and having hook-like portions adapted to engage the ends of the spring remote from the inner ends of the extension arms, said hook-like members on said first, second, third and fourth members being formed so as to permit only limited bending movement of the springs.

5. In a signalling device, a diamond-shaped, flexible, sheet-like member having signalling indicia on one side thereof, pocket elements arranged at the corners of said sheet-like member, means comprising cross-arm

members constructed so that the ends thereof may be received in said pockets serving to maintain said sheet-like members in a taut condition, means pivotally interconnecting said cross-arm members so that the same may be moved from a generally aligned inoperative storage condition to a right-angled intersecting display condition in which one arm is vertical, at least one of said cross-arm members being resiliently yieldable in planes normal to said sheet-like member and yieldable in response to wind loadings on said sheet-like member to afford wind spilling, and a support stand engaging the vertical one of said cross-arm members.

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