

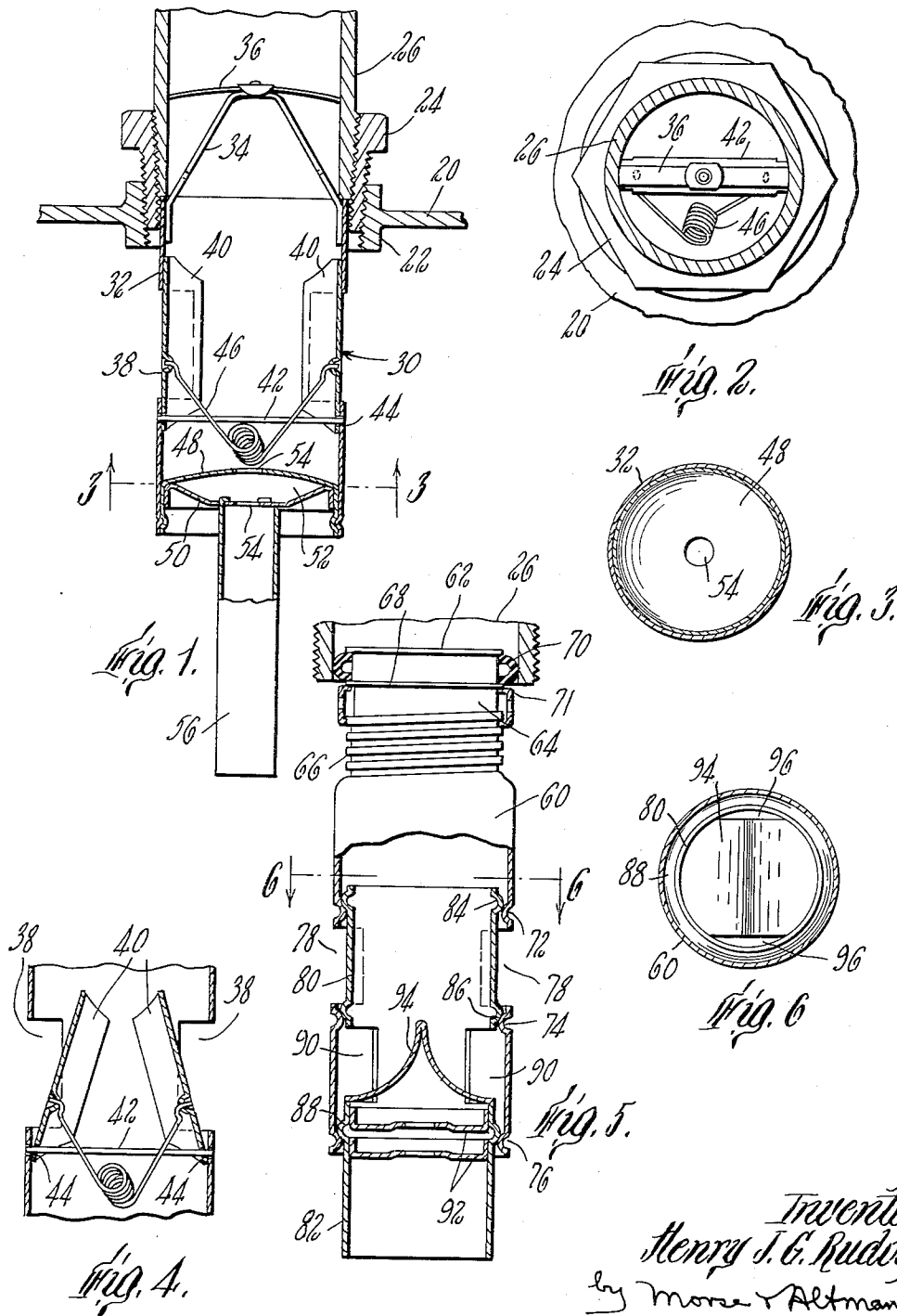
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MEANS FOR INSTALLING SAME

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Filed May 12, 1959

2 Sheets-Sheet 1



Inventor
Henry J. G. Rudolf
by Moore & Altman
Attys.

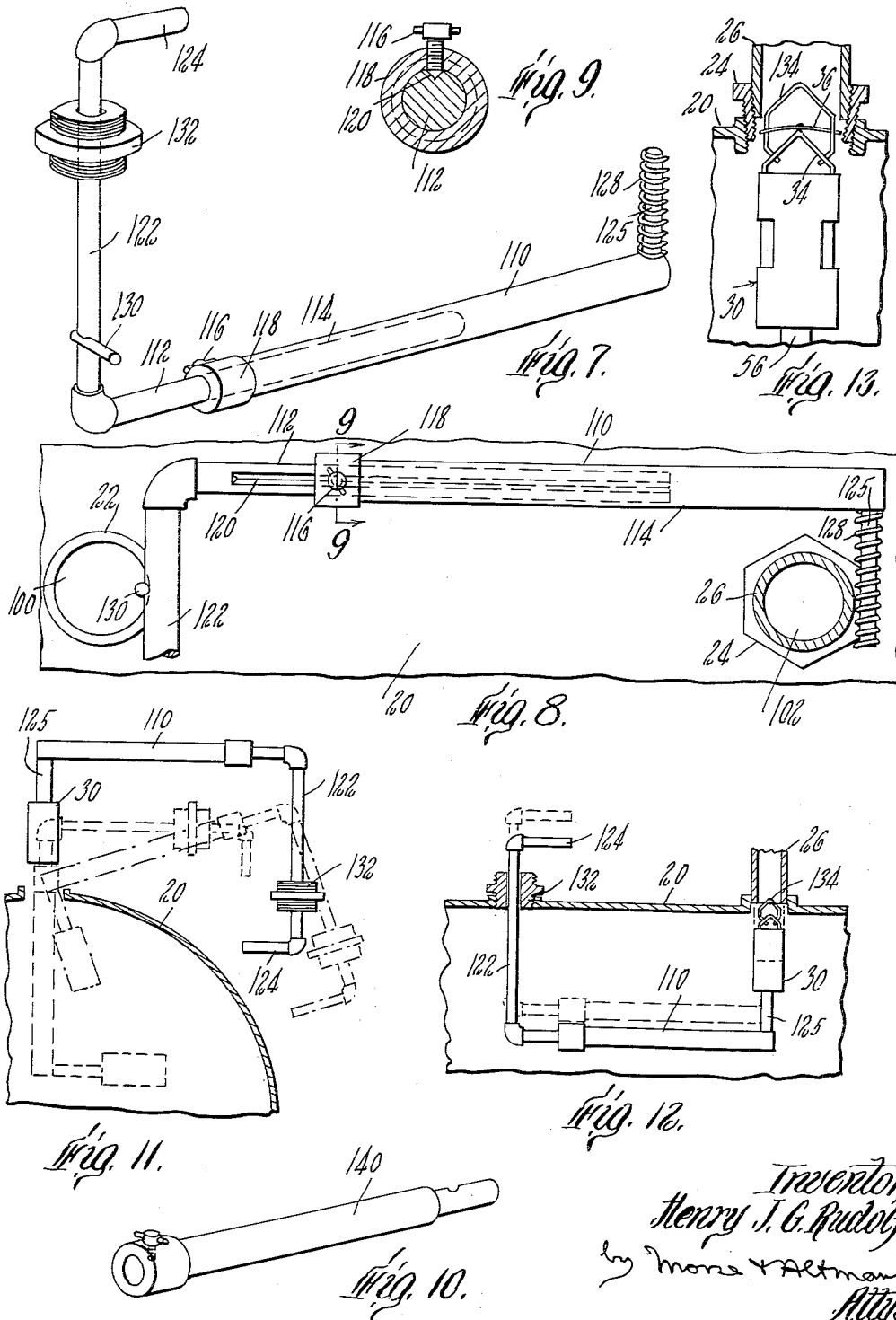
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Inventor
Henry J. G. Rudolf
by Morris Altman
Attys.

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AUDIBLE SIGNAL DEVICE FOR OIL TANKS AND MEANS FOR INSTALLING SAME

Henry J. G. Rudolf, Cambridge, Mass., assignor to Applied Mechanics Co., Boston, Mass., a corporation of Massachusetts

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This invention relates to a signal device of the whistler type for installation in the vent line of an oil tank to be sounded by the outflow of air through the vent when the tank is being filled. A small tube from the whistle unit extends down a few inches into the tank from the vent outlet so that when the level of liquid in the tank rises to the lower end of the small tube and thus shuts off the air flow through the tube, the whistling sound stops and the attendant is then supposed to shut off the inflow of liquid to the tank. If the attendant is inattentive or otherwise engaged at such time, provision must be made for the escape of excess liquid through the vent pipe at as great a rate as that of the incoming stream to avoid the building up of dangerous pressures within the tank. As the whistle tube is much too small for such an outflow, it has been customary to make the whistle and its tube as a separate unit which rests on a seat in a chamber between the vent opening of the tank and the vent pipe. When sufficient pressure builds up in the tank, the whistle is lifted from the seat, allowing air or oil to flow out through the vent pipe. The walls of the chamber must be strong enough to support the vent pipe. The customary signal device is therefore a casting which is mounted between the vent outlet of the tank and the vent pipe which usually leads to the outside of the building in which the tank is installed. In order to install a signal device of this type in a vent pipe, it is necessary either to dismantle the entire vent pipe line, or when this is not feasible (it usually isn't), to cut the vent pipe near its junction with the tank. Either method is laborious and expensive. A prime object of the present invention is to provide a whistler device which can be installed from within the tank without disturbing the vent pipe. Another object of the present invention is to provide a signal device which is much lighter in weight, cheaper to make, and more effective in operation. The improved signal device hereinafter described weighs only about one fifth as much as the prior art devices now in use, can be made at a much lower cost, and permits a much lower maximum pressure within the tank when the latter is filled to overflow.

According to the present invention, a whistler device is provided which can be attached to the tank end of a vent pipe before the latter is attached to a tank, the diameter of the whistler device being sufficiently small to permit it to be thrust through the threaded fitting or bushing on the tank which receives the threaded end of the vent pipe.

Furthermore, there are many fuel tanks now in use which have vent pipes connected thereto but have no whistle signal. Such vent pipes usually pass through the foundation wall of the building in which the tank is installed so that it is difficult to install a whistler device in the vent line except at the expense of much time and effort. Hence a further prime object of the invention is to provide a method of and means for installing a whistler device in an existing vent line with the expenditure of

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little time and effort and without disturbing the vent line itself.

The usual domestic fuel tank is provided with three openings in the top thereof, one for use in filling the tank, one for a depth gauge, and one for a vent pipe. According to the present invention, an adjustable holder is provided to support a whistler device while the latter is introduced into the tank through the gauge opening and brought up into the portion of the vent pipe contiguous to the tank. The whistler device is provided with means which automatically grips the interior of the vent pipe into which it is inserted by manipulation of the holder. This permits the disengagement of the holder from the device, leaving the latter in operating position in the tank. The holder is then withdrawn from within the tank and the gauge or other closure for the gauge opening is replaced, completing the installation operation.

For a more complete understanding of the invention, reference may be had to the following description thereof and to the drawings, of which

Figure 1 is an elevational view, mostly in section, of a device embodying the invention, said device being mounted in the end of a vent pipe installed in the vent outlet of a tank;

Figure 2 is a plan view of the device shown in Figure 1; Figure 3 is a section on the line 3—3 of Figure 1;

Figure 4 is a fragmentary sectional view of the device shown in Figure 1, the doors being shown in their open position;

Figure 5 is an elevation, partly in section, of a modified form of the device;

Figure 6 is a section on the line 6—6 of Figure 5;

Figure 7 is a perspective view of a holder for installing a whistler device;

Figure 8 is a fragmentary plan view of a tank with an installing holder being adjusted to the tank openings; Figure 9 is a section, on a larger scale, taken on the line 9—9 of Figure 8;

Figure 10 is a perspective view of an attachment to increase the length of the holder shown in Figures 7 and 8;

Figures 11 and 12 are diagrammatic fragmentary sectional views of a tank, showing successive positions taken by the installing holder in the process of installing a whistler device in a vent pipe which is already connected to the tank; and

Figure 13 is an elevation (on a larger scale) of a whistler device about to enter a vent pipe.

Domestic oil tanks are customarily made with openings at the top in which are welded short, internally threaded cylinders 22. The usual size is for threaded engagement with a 1½" pipe or a bushing 24. As the standard size adopted for vent pipes 26 is 1¼", a bushing 24 is screwed into the fitting 22 to connect the vent pipe 26 to the tank. According to the present invention, a whistler device 30 is provided which can be attached to the end of the vent pipe 26 so as to project therefrom in alignment therewith.

The whistler device 30 comprises a tubular housing 32, preferably of thin sheet metal, this housing having a diameter between the interior and exterior diameters of a 1¼" pipe, so that the upper end of the housing 32 can abut the end of the pipe 26 as indicated in Figure 1. Since the interior and exterior diameters of standard 1¼" iron pipe are 1.4" and 1.61" respectively, the diameter of the housing 32 is preferably approximately 1½".

A simple but effective means is provided to hold the device 30 in assembled relation with the pipe 26. Such means consists of a yoke or arch 34 having its ends secured as by welding within the upper end of the housing 32 and projecting upward from the housing to support a

thin leaf spring 36 which is slightly arched and is just enough longer than the interior diameter of the pipe to be sprung to a slightly sharper curvature when pushed into the end of the pipe as indicated in Figure 1. The ends of the spring 36 act as ratchet teeth or a one-way clutch to grip the interior of the pipe and hold the upper end of the housing 32 tightly against the end of the pipe 26.

The housing is provided with one or more lateral openings 38 of substantial size to furnish adequate exits for air or oil from the tank into the vent pipe. Two such openings are indicated in Figures 1 and 4, each of these openings being, for example, one inch square.

These openings are normally closed by doors 40 which are pivotally supported, preferably at the lower end, by a transverse bar 42 which extends across the interior of the housing below the openings 38 and passes through a short slot 44 in each door. The doors are held yieldingly in the closed position by a spring 46 which, as shown, may be a coil with end portions projecting tangentially in different directions. The extremities of these extensions engage the respective doors at points above the pivots so as to press the doors to their closed position.

At the lower end of a housing 32 is a whistler consisting of two disks 48 and 50 which present concave faces to each other to enclose a chamber 52. Each disk has a central perforation 54. A tube 56 is attached to the lower disk 50 around the perforation 54 and extends downward therefrom.

When oil is being fed into the tank through the supply opening (not shown), the displaced air rushes out through the whistle, causing a shrill sound which can easily be heard by the attendant. When the oil level reaches the lower end of the tube 56, the air can no longer escape through the whistle so that the warning sound then stops as a signal for the attendant to turn off the supply stream. If for any reason this is not done and the oil level continues to rise, the doors 40 readily yield as indicated in Figure 4 to permit the escape of oil through the vent pipe 26.

A modified form of the invention is shown in Figures 5 and 6. This form comprises a cylindrical housing 60 of thin metal to be attached to the end of a vent pipe 26 in alignment therewith by any suitable means such as that shown in Figure 1 or the means shown in Figure 5. The latter comprises an end flange 62 on the reduced upper portion of the housing. Below the flange 62 is a smooth portion 64 of the housing, and below that is a screw-thread 66 which is rolled or pressed in the housing wall. A washer 68 is slidable on the smooth portion 64. A rubber skirt 70 surrounds the housing between the flange 62 and the washer 68. A one-thread nut 71 engages the thread 66 and is rotatable thereon to press the washer 68 upward so as to squeeze the skirt 70 between the washer 68 and flange 62. This is done after the upper end of the device is inserted into the pipe 26. As the washer 68 is pressed toward the flange 62, the skirt 70 bulges into engagement with the wall of the pipe and thus holds the device attached to the pipe.

The main portion of the housing 60 is provided with three equally spaced, circumferential inner ribs 72, 74, 76. Between the ribs 72, 74 one or more openings 78 of substantial size are provided in the wall of the housing, two such openings being shown in Figure 5.

Loosely slidable within the housing 60 is a tubular valve member 80, the lower part 82 of which projects down below the lower end of the housing 60. Near the upper end of the member 80 is a circumferential outer rib 84. Spaced below this rib are two more similar ribs 86, 88, the spacing being the same as that between the inner ribs 72, 74, 76 of the housing 60. Normally the valve member 80 is suspended within the housing by the engagement of the ribs 84, 86, 88 on the ribs 72, 74, 76, respectively. The portion of the member 80 between the ribs 84, 86 is imperforate, so that these ribs and the tubular portion between them normally close the openings

78. Between the ribs 86, 86 there are large ports or openings 90 through the wall of the valve member 80. Just below these ports two disks 92 with central perforations are mounted within the member 80 to form the whistle.

When oil is flowing into the tank, the whistle sounds as displaced air flows up through the lower end 82 of the valve member. When the oil level reaches this lower end, pressure soon builds up sufficiently to lift the light valve member 80 so that the openings 90 register partly or fully with the openings 78, thus permitting the escape of air and/or oil into the vent pipe 26. A guide member 94 may be mounted within the member 80 to deflect upward the streams entering through the ports 90, spaces 96 being left on either side of the guide member for the passage of air entering through the whistle.

A whistler device having gripping means as shown in Figure 1 can be easily mounted in the vent pipe of an already installed tank without removing or disturbing the vent pipe. Every domestic fuel oil tank is provided with two, and usually three, openings in its top, one opening being to receive a filling pipe, the second opening being for the vent pipe, and the third being for a gauge. These openings are usually designed to receive a threaded end of a 2", 1½" or 1¼" pipe. Since vent pipes are usually 1¼" size, a threaded bushing is employed where the vent opening is for a larger size. The apparatus hereinafter described for mounting a signal device in a previously installed vent is designed for tanks with standard openings, but dimensions can be altered for non-standard tanks.

Figure 8 illustrates part of the top of a tank 20, two openings 100, 102 for 1½" pipe being shown. The vent pipe 26 is mounted in the opening 102 by means of the bushing 24. A tool for inserting a signal device in through the opening 100, aligning the device with the vent pipe 26, and moving the device into gripping engagement with the vent pipe is shown in Figure 7. The tool comprises a horizontal arm 110 which is preferably adjustable as to overall length for use in tanks having different spacing between the openings 100 and 24. For this purpose the arm may comprise two telescoping parts such as a rod 112 extending into a tube 114. To hold these parts in adjusted position a thumb screw 116 is threaded through the reinforced end 118 of the tube 114 and engages in a V-groove 120 in the rod 112 to prevent any relative angular change between the rod and tube. At the outer end of the rod 112 is a perpendicular shank 122 with a handle 124 at its upper end. At the remote end of the arm 110 is a vertical stem 125 adapted to enter the tube 56 of a signal device so as to support the device releasably in a vertical position wherein its longitudinal axis is parallel to the shank 122. To grip the signal device sufficiently to prevent its falling off when inverted, a helical spring 128 is provided on the stem 125, this spring having an outside diameter to fit snugly into the tube 56 of a signal device. The spring is secured only at the junction of the stem with the arm 110 so that when the stem is withdrawn from within a tube 56, the drag of the turns of the spring on the inner surface of the tube tends to elongate the spring and thus to diminish its diameter. This facilitates the withdrawing of the stem from the signal device after the latter has been attached to the end of a vent pipe.

To insert a signal device into a tank through an opening 100 and to maneuver it into position in line with a vent pipe 26 which has previously been mounted in the vent opening 102 of the tank, the arm 110 of the carrying tool is first adjusted, if necessary, as to its length. For this purpose a gauge pin 130 is permanently fixed in the shank 122 at right angles to the plane of the arm 110, shank 122 and stem 125. The pin is so located that when it is thrust into the opening 100 and held against the side nearest to the vent opening 102, the axis of the shank 122 will be offset from the center of the opening 100 by the same distance that the axis of the stem 125

is offset from the center of the vent pipe 26 when the spring 123 touches the far side of the vent pipe as indicated in Figure 8. When the length of the arm 110 is thus properly adjusted, the spacing between the axis of the shank 122 and stem 125 will equal the spacing between the centers of the openings 100, 102. A signal device is mounted on the stem 125 and inserted into the tank as indicated in Figure 11.

When the tool has reached a position similar to that shown in Figure 12, an externally threaded device 132 which is slidably fitted on the shank 122 is screwed into the opening. This keeps the shank 122 aligned with the axis of the opening 100. Consequently the stem 125 and the signal device thereon are aligned with or parallel to the axis of the vent pipe 26. If the handle 124 is parallel to the arm 110, it gives a visual indication of the direction in which the arm 110 extends from the opening 100. To get the signal device exactly in line with the vent pipe, a simple guide element 134 may be mounted on the device before it is inserted into the tank. As shown, this guide element is a piece of wire bent to form an inverted V with its ends sprung into small holes in the yoke 34. This serves as a feeler to guide the signal device into the pipe 26. When the device is thus aligned, the tool and device are lifted to move the yoke 34 into the pipe so that the spring 36 catches on the interior of the pipe and retains the device in position with the upper end of the housing 30 abutting the end of the pipe 26. The tool is then moved downward to disengage it from the device, and is then removed from within the tank, leaving the signal device properly and permanently installed.

In unusual cases where the spacing between tank openings is greater than can be spanned by the arm 110, the arm can be elongated further by the insertion of an extender 140 between the rod 112 and the tube 114. The extender may be provided in different lengths if required, but in most cases no extender will be necessary.

I claim:

1. A whistle signal device adapted to be mounted at the tank end of a vent pipe attached to a tank, said device comprising a tubular housing having an outside diameter at its upper end less than the outer diameter of said end of the vent pipe but greater than the inner diameter of said end of the vent pipe, said housing having lateral openings, yieldable closure means within said housing normally closing said openings but adapted to yield to open position in response to external fluid pressure, a whistle unit in said housing below the level of said open-

ings, and yieldable one-way clutch means supported by said housing above the upper end thereof and normally of greater length than the internal diameter of said vent pipe.

2. A whistle signal device of claim 1 wherein said yieldable closure means includes a bar extending across the interior of said housing at a level below that of said openings, closure elements loosely pivoted at their lower ends on said bar, and spring means within said housing yieldably pressing said closure elements to their closed position.

3. A whistle signal device adapted to be mounted at the tank end of a vent pipe attached to a tank, said device comprising a housing which is greater in diameter than the interior of said vent pipe, a whistle unit carried in said housing, means in said housing for relieving excess tank pressure, a yieldable one-way clutch means attached to said housing above the upper end of said housing, said one-way clutch means having a dimension at right angles to the vertical axis of said housing normally greater than the interior diameter of said vent pipe and being insertable into the tank end of said vent pipe to support said housing.

4. A whistle signal device of claim 3 wherein said yieldable one-way clutch means includes a yoke projecting from the upper end of said housing, and a transverse leaf spring normally of greater length than the internal diameter of said vent pipe, said leaf spring being secured to said yoke.

5. A whistle signal device of claim 3 including a tube extending downwardly below said housing, a holder detachably connected to said tube, said holder including a horizontal arm, upstanding means at one end of said arm for detachably engaging said tube, an upright extension at the other end of said arm, and a handle at the upper end of said extension.

6. A whistle signal device of claim 5 wherein said horizontal arm includes a plurality of members relatively adjustable to vary the overall length of said arm.

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