

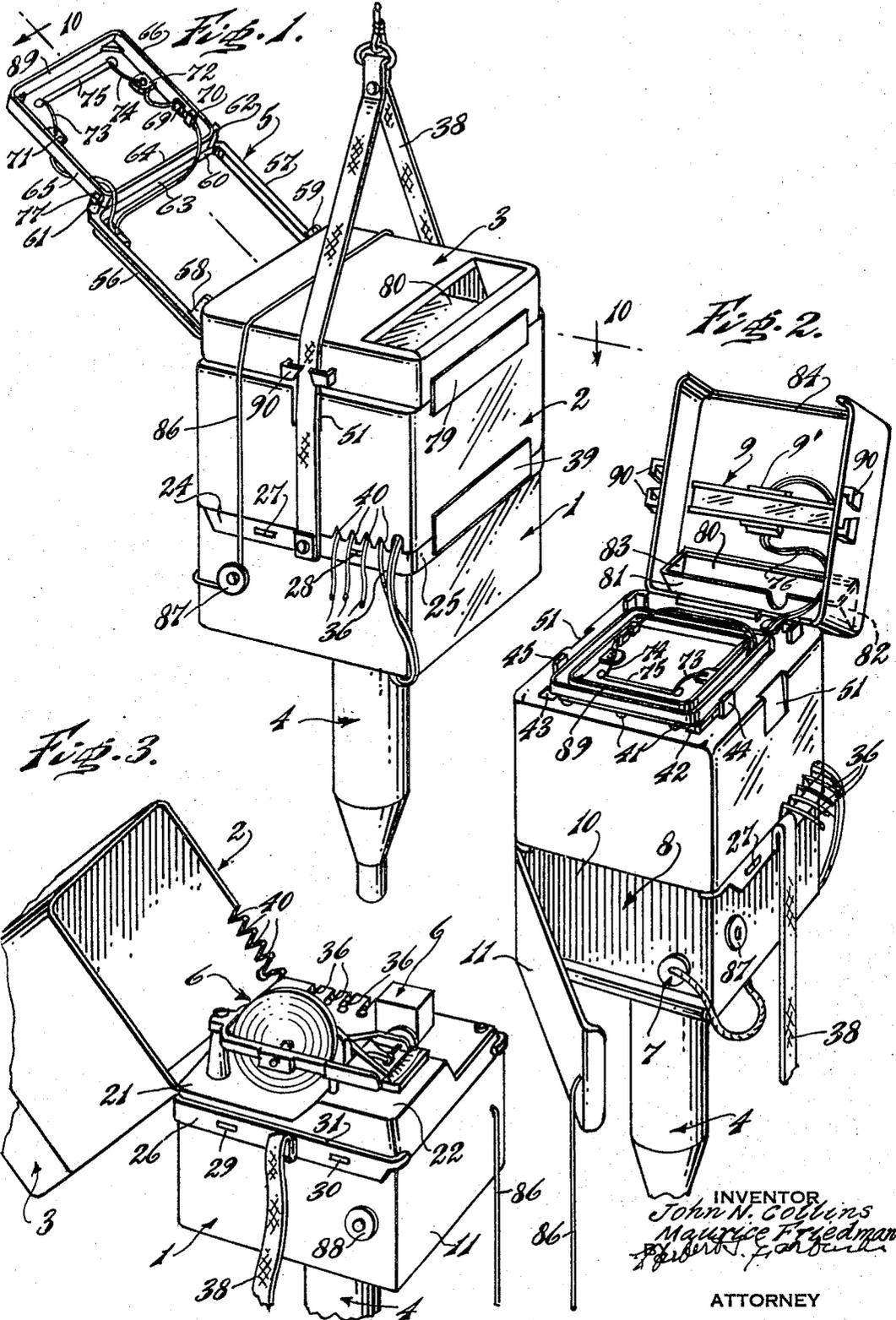
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J. N. COLLINS ET AL  
PACKAGE FOR RADIOSONDE

3,353,100

Filed April 6, 1964

3 Sheets-Sheet 1



INVENTOR  
John N. Collins  
Maurice Friedman  
Robert J. F. ...

ATTORNEY

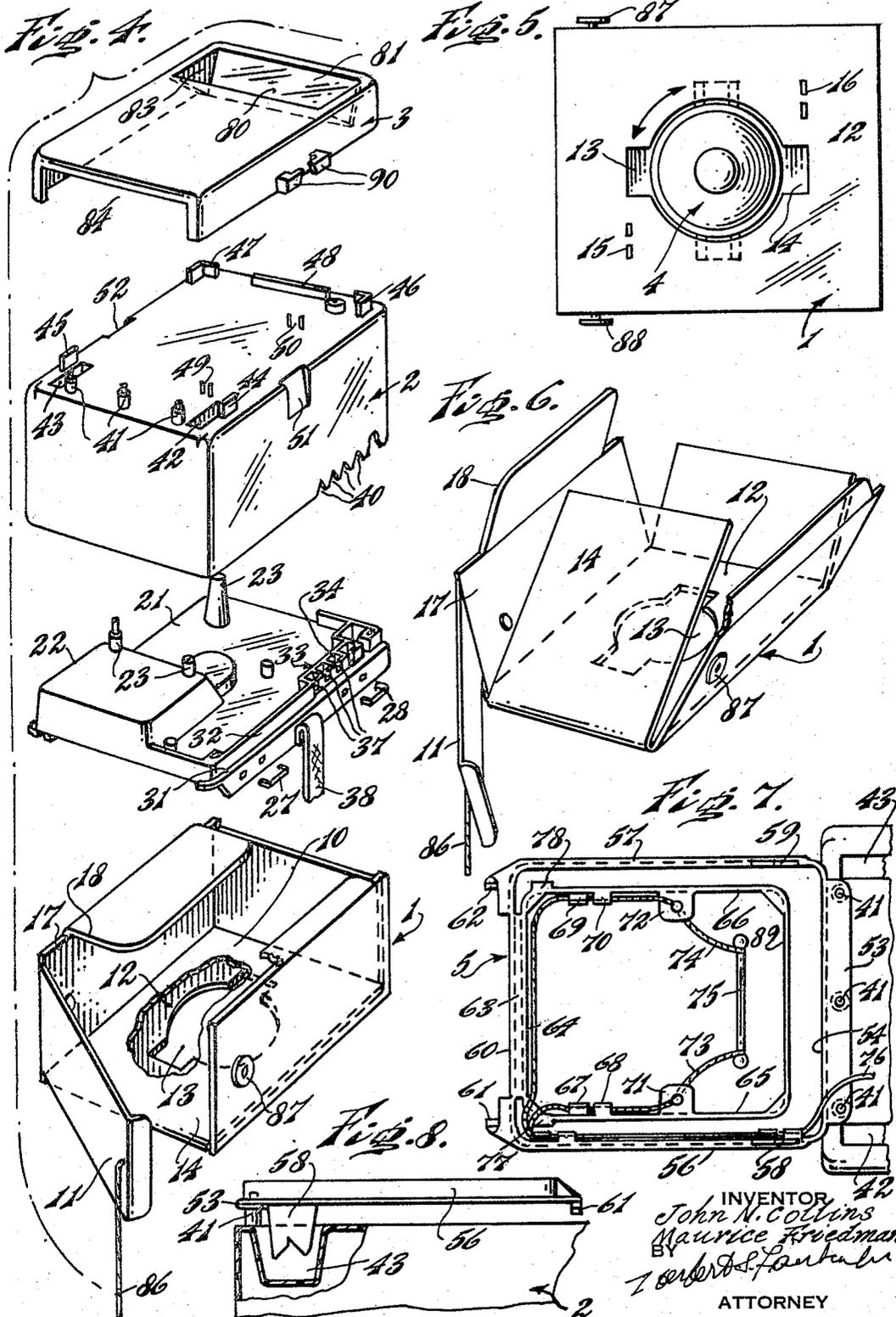
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INVENTOR  
 John N. Collins  
 Maurice Friedman  
 BY  
 Robert S. Fankhauser  
 ATTORNEY

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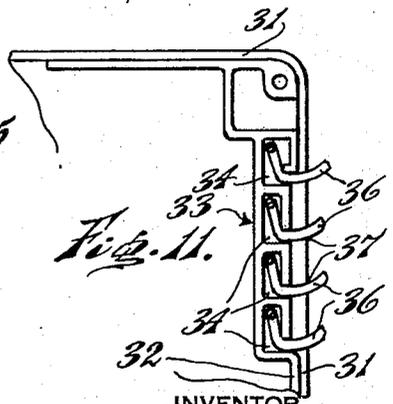
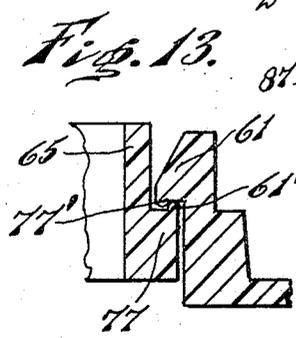
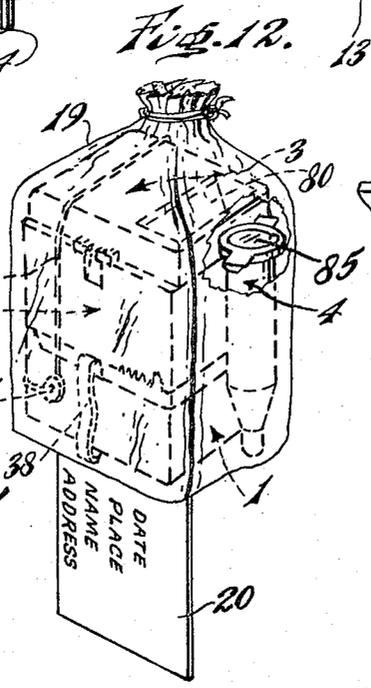
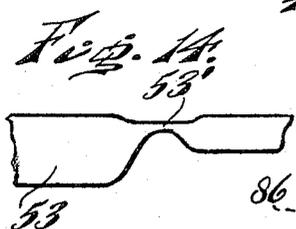
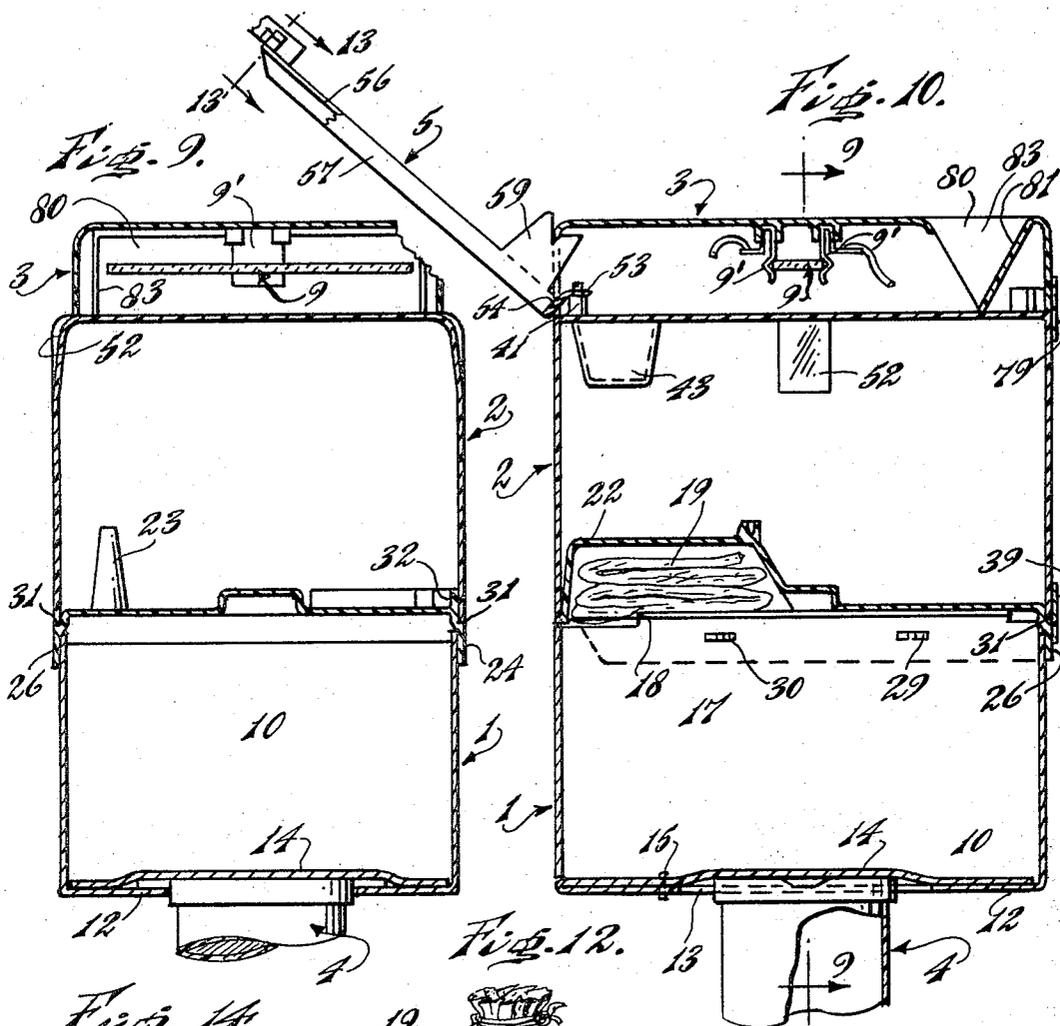
J. N. COLLINS ET AL

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PACKAGE FOR RADIOSONDE

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3 Sheets-Sheet 3



INVENTOR  
 John N. Collins  
 Maurice Friedman  
 BY  
 Herbert S. Faindel  
 ATTORNEY

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**PACKAGE FOR RADIOSONDE**

John N. Collins, 513 Burton Road, Orelang, Pa. 19075,  
and Maurice Friedman, 7961 Thouron Ave., Philadelphia, Pa. 19150

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4 Claims. (Cl. 325-113)

A radiosonde is, briefly, an instrument intended to measure humidity and temperature and also pressure in the upper atmosphere.

A balloon lifts the instrument to high altitudes and a small parachute breaks the return fall once the balloon bursts.

Generally, the radiosonde is considered an expendable item but many are found and returned for reconditioning and reuse.

The design preceding the present invention was constructed of a particularly critical corrugated fibreboard that was easily damaged.

The major faults of prior devices are:

(1) Undependable resistance to water damage by direct leaks or gradual soaking of the paper box in flight or on the ground.

(2) Electrical leakage of the circuitry directly caused by water penetration.

(3) Added plastic parts were required to insure electrical insulation at critical points.

(4) Assembly and subsequent service were made very difficult because a watertight seal made reopening the box almost destructive. Even minor adjustments of the relay or modulator were nearly impossible.

(5) Return of the instruments through the mail required the finder to follow detailed directions. This feature assumed each finder could read which was often not the case.

(6) The thermistor element was exposed to damage since a maximum extension was desired and the box limited the mechanical arrangements possible.

(7) Verification of serial numbers and other examination of the internal parts was difficult due to the general inaccessibility of the paper box.

(8) Where eight (8) or more varieties of radiosondes are in current use the paper box design did not lend itself to interchangeability. Each type had to be built around specific requirements.

With the foregoing in view, the object of this invention is to devise a novel package for radiosonde which overcomes the objections to prior devices and which provides a durable and weather-proof package with a novel construction and arrangement of component parts.

For the purpose of illustrating the invention, we have shown in the accompanying drawings a preferred embodiment which we have found in practice to give satisfactory and reliable results. It is, however, to be understood that the various instrumentalities of which the invention consists can be variously arranged and organized without departing from the spirit and scope of the invention, and therefore do not desire to be limited, except by the scope of the appended claims to the exact arrangement and organization of these instrumentalities as herein set forth.

FIGURE 1 is a perspective view of a radiosonde embodying our invention.

FIGURE 2 is a perspective view of the radiosonde with the top cover or duct housing raised and the outrigger in folded position.

FIGURE 3 is a perspective view, with the baroswitch housing opened to expose the baroswitch mechanism.

FIGURE 4 is an exploded view of certain of the parts.

FIGURE 5 is a bottom view of the base showing the transmitter engaged in the bottom.

2

FIGURE 6 is a perspective view of the base with the transmitter engaged in the base.

FIGURE 7 is a top plan view of the outrigger in folded condition and positioned on the supporting lugs on the top of the baroswitch housing.

FIGURE 8 is a side elevation of the folded outrigger of FIGURE 7 after it has been folded over into position on the baroswitch housing, which is partly broken away.

FIGURE 9 is a section on the line 9-9 of FIGURE 10.

FIGURE 10 is a section on the line 10-10 of FIGURE 1.

FIGURE 11 is a top plan view of a fragment of the baroswitch housing on an enlarged scale, showing details of the labyrinth.

FIGURE 12 is a perspective view of the radiosonde with the transmitter disconnected and the entire assembly inserted in a shipping bag, with a portion of the bag broken away.

FIGURE 13 is a section on the line 13-13 of FIGURE 10.

FIGURE 14 is an enlarged side elevation of the mounting hinge of the outrigger.

Similar numerals indicate corresponding parts.

Referring to the drawings:

For convenience of illustration we will first identify the main component parts; a base 1, a baroswitch housing 2, a top cover 3, a transmitter 4, an outrigger 5, a baroswitch circuit 6, said baroswitch being a pressure transducer connected with a plug 7 with a battery 8 and a sensitized plate 9.

*The base*

The base 1 is in the form of a rectangularly shaped box having a battery receiving chamber 10 and having a front wall in the form of a hinged door 11, best seen in FIGURE 2. The bottom wall 12 is cut out at 13 to form a bayonet type connection with the upper end of the transmitter. The bottom wall has an upper folded over portion 14 which maintains a tension on the arms of the transmitter when the latter is assembled therewith. The two portions of the bottom are stapled together at two points as at 15 and 16. This is best seen in FIGURES 4, 5 and 6.

The opposite side walls of the base are deflected inwardly at their upper ends and the one side wall 17 on the left side of the door opening is cut away as at 18 to permit space for inserting a shipping bag 19 to be stored and later to be withdrawn and provided with a tag 20 with a return address. This is best seen in FIGURES 10 and 12.

The top of the base 21 is waterproof and is provided with a mounting platform 22, hollow underneath and contributing to form a space for the shipping bag, and having mounting posts 23. The sides and rear of the platform 22 overlap the base as at 24, 25 and 26, the platform being fixed to the base on each side wall by staples 27, 28, 29 and 30. The upper part of the overlapping sides form a shoulder 31 which provides a seat for the baroswitch housing 2. Extending from the right side of the platform 22 and integral therewith is an upwardly extending wall 32 extending rearwardly and terminating in a labyrinth 33 consisting of a plurality of pockets 34 adapted to receive test wires 36, the pockets 34 being provided with slots 37, having their bottoms raised above the surface of the mounting platform to prevent the entrance of moisture, and open at their tops, said test wires being passed downwardly through slots in the printed circuit block into the pockets of said labyrinth and then through said slots in such a way as to cause a snubbing

action on the wires as shown in FIGURE 11, to prevent the breakage of the wires.

A harness 38 is fixed to each overlapping wall of the platform 22 in any desired manner.

#### *Baroswitch housing*

The baroswitch housing is rectangular, has a slip fit over the platform 22 and is in hinged connection therewith by a plastic hinge 39. The side wall which overlaps the labyrinth is provided with open end V shaped slots 40 through which the test wires pass when the housing is in closed position, and by reason of their V shape, compress the wires in the bottom of their slots, thus providing a watertight housing which seals the baroswitch circuit from moisture. The closed top surface provides a platform 15 for mounting the outrigger 5, having upwardly extending projections 41 on which a hinge of the outrigger is mounted and provided with pockets 42 and 43 adapted to receive the legs of the outrigger when in folded and stored condition. Adjacent the pockets 42 and 43 are guide lugs 44 and 45, having corresponding lugs 46 and 47 at the rearward end of the housing and an additional guide lug 48 across the rear. Retaining pins 49 and 50 are also provided to retain the lead wires in position. Suitable recesses 51 and 52 are formed in the top of the housing 2 to form guides for the harness.

#### *Outrigger*

The outrigger 5 is formed of a one piece flexible plastic molding consisting of a hinge portion 53 with a relieved portion 53', a detail of which is shown in FIGURE 14, adapted to be received and fixed on the upwardly extending projections 41 on the top surface of the baroswitch housing, said hinge portion forming part of an end arm 54, said arm 54 being provided with side arms 56 and 57, arms 56 and 57 also being provided with supporting lugs 58 and 59. Arms 56 and 57 are connected at their forward ends by end arm 60, said arm 60 having latch portions 61 and 62. The arm 60 also forms part of hinge 63, said hinge having a relieved portion the same as hinge 53, connecting an inner end arm 64, having side arms 65 and 66, having suitable lugs 67, 68, 69 and 70 to retain lead wires. The side arms 65 and 66 are provided with lugs 71 and 72 adapted to receive lead wires 73 and 74 which support a thermistor element 75, said element being in electrical circuit with the sensitized plate 9 mounted in the top cover 3, by leads 76, and also connected to the printed circuit of the baroswitch. The side arms 65 and 66 are connected at the end opposite the hinge by an arm or bail 89 which serves to protect the thermistor 75 from damage and are also provided with lugs 77 and 78, provided with projections 77' and 78', which cooperate with the corresponding latch portions 61 and 62, having projections 61' and 62', as best seen in FIGURE 13.

#### *Cover*

The cover 3 forms a duct housing and is hinged to the baroswitch housing 2 by a plastic hinge 79. The cover 3 has an air intake opening 80 at its rear top portion, formed by a downwardly and forwardly deflected portion 81 and side walls 82 and 83 to form a duct. The forward end of the cover is open as at 84, to provide an opening for the free passage of air to the sensitized plate 9, said plate being held in position by spring clips 9'. The sides of the cover 3 are provided with retaining and guiding lugs 90, adapted to receive and retain the harness 38.

When the outrigger is extended to its operating position, as seen in FIGURE 1, the inner arms are first extended forwardly and latched into locked position, as seen in FIGURES 1 and 13. The supporting lugs 58 and 59 are then engaged in the front opening 84 of the cover 3, as best seen in FIGURE 10.

The transmitter 4 is also provided with a removable snap-on cover 85 as seen in FIGURE 12.

The package is retained in assembled condition by a

tie string 86 fixed to the front of the battery door, then being passed around a button 37 fixed to one wall of the base 1, thence being passed around the closed baroswitch cover and the top cover, then downwardly to another button 38 fixed to the opposite wall of the base 1, the string being passed around said button one or two turns.

The baroswitch housing and the cover are preferably formed from polystyrene plastic. The baroswitch housing when opened provides complete access to the baroswitch circuit, and the vital parts are completely protected from unfavorable weather conditions. The outrigger which is preferably formed from polypropylene, can be extended so that it is of greater length than the compartment than that into which it is folded in order to extend it farther from the case, thus reducing the error from re-radiated heat from the case.

On return shipment of the package to the Weather Bureau or the manufacturer, when it is recovered on the ground, the cord is unfastened, the outrigger unlatched and folded into closed position and the cover closed, the transmitter is detached and placed alongside the package and placed with it inside the shipping bag, and the complete package is given to the post office or rural mail carrier for return shipment.

The baroswitch is technically a pressure transducer. Having thus described our invention, what we claim as new and desire to secure by Letters Patent is:

1. A radiosonde package for radiosonde comprising a base portion having a battery receiving compartment, a battery in said compartment, a pressure transducer including an electrical circuit mounted on the top of said base, a pressure transducer housing movably connected with said base and sealed when closed with the top of the base, and a foldable outrigger mounted on top of said housing, a thermistor on said outrigger, a cover movably connected to said housing and having intake and discharge air openings forming an air stream between the cover and housing, a humidity element secured within the air stream within said cover and a transmitter detachably connected with said base, said humidity element, thermistor, transmitter and pressure transducer being in electrical connection with said battery and electrical circuit.

2. The means defined in claim 1, wherein a shipping bag with a return address within the package is provided, whereby when the package is dropped, the finder can place the package in the bag and deliver it to a post office.

3. The construction and arrangement defined in claim 1 wherein a labyrinth is provided on top of the base in the form of pockets with upwardly opening slots to receive test wires and the housing is provided with slots opening downwardly to receive and bind the test wires in position when the housing is in closed position.

4. A radiosonde package comprising a chambered base having an opening to permit insertion of a battery and having a door closing said opening and having a closed top forming a mounting, a pressure transducer on said mounting, a pressure transducer housing hinged to said base, having an open bottom and a slip fit connection with the base, the top of said transducer housing forming an outrigger mounting, an outrigger hinged on said outrigger mounting, a thermistor mounted in said outrigger, a cover hinged to the transducer housing, having a slip fit therewith, said cover forming a duct having an air intake at its top at one end and an air discharge opening in proximity to said outrigger, a sensitized plate mounted in the air stream in the duct formed by the cover and the top of the pressure transducer housing, said plate, thermistor, pressure transducer and battery forming part of an electric circuit and a transmitter secured to the bottom of said base and in the electrical circuit with the sensitized plate, thermistor, pressure transducer and battery, means to retain the base, pressure transducer housing and cover in closed relationship and a

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harness mounted on said package for suspending the  
radiosonde package in the atmosphere.

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JOHN W. CALDWELL, *Primary Examiner.*