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STEWART

WEATHER INSTRUMENTS



Observation of wind direction and velocity.



The wind is the most important and most variable factor affecting the weather and our daily lives.

Accurate knowledge of wind movement is often desirable and frequently essential in many fields — on land, at sea, or in the air.

Many people who have long been interested in winds, and the direction and speed of the wind have wished for some means of gratifying their natural curiosity concerning this subject.

The high cost of wind instruments has generally prevented their extensive use, but this obstacle has now been removed by the development of reliable, low cost instruments of standard design and rugged construction.

Stewart wind instruments are specially designed to meet the need for accurate instruments of moderate price. Thousands are now in use by private agencies and individuals in all parts of the world, as well as many government departments such as the U. S. Forest Service, National Park Service, U. S. Lighthouse Service, U. S. Engineers, and the forestry services of Canada and New Zealand. The use of these instruments will prove fascinating and instructive, and their nominal cost places them within the reach of every one.



The electric Wind Vane is equipped with electrical contacts for connection by cable to 8 separate lights arranged on a dial indicator. Each of the lights corresponds to one of eight points of the compass so as to furnish accurate, dependable, remote indication of wind direction, day or night.

One of the lights is lighted at all times, and when the vane is halfway between two points of the compass two lights are lighted so that 16 point indication is obtained. A low voltage electric circuit is used so that the current consumption is very small. Two or three dials can be connected to the same instrument giving simultaneous indication in different places if desired.

The Anemometer is made for connection to a low voltage electric circuit operating a flash or buzzer indicator. The instrument is the 1/60th mile type, and closes the circuit a number of times per minute which is equal to the speed of the wind in miles per hour. A table of corrections is furnished so that wind velocities can be measured within an accuracy of 1 mile per hour.

Any convenient source of current can be used, such as dry batteries, storage battery, or a bell ringing transformer furnishing 6 to 8 volts, and elaborate wiring is not required.



The use of Stewart electric wind instruments now makes it practical to secure reliable, continuous indication of wind direction and velocity — anywhere — anytime. Stewart non-electric instruments, and instrument accessories, can be used to meet special requirements however varied.

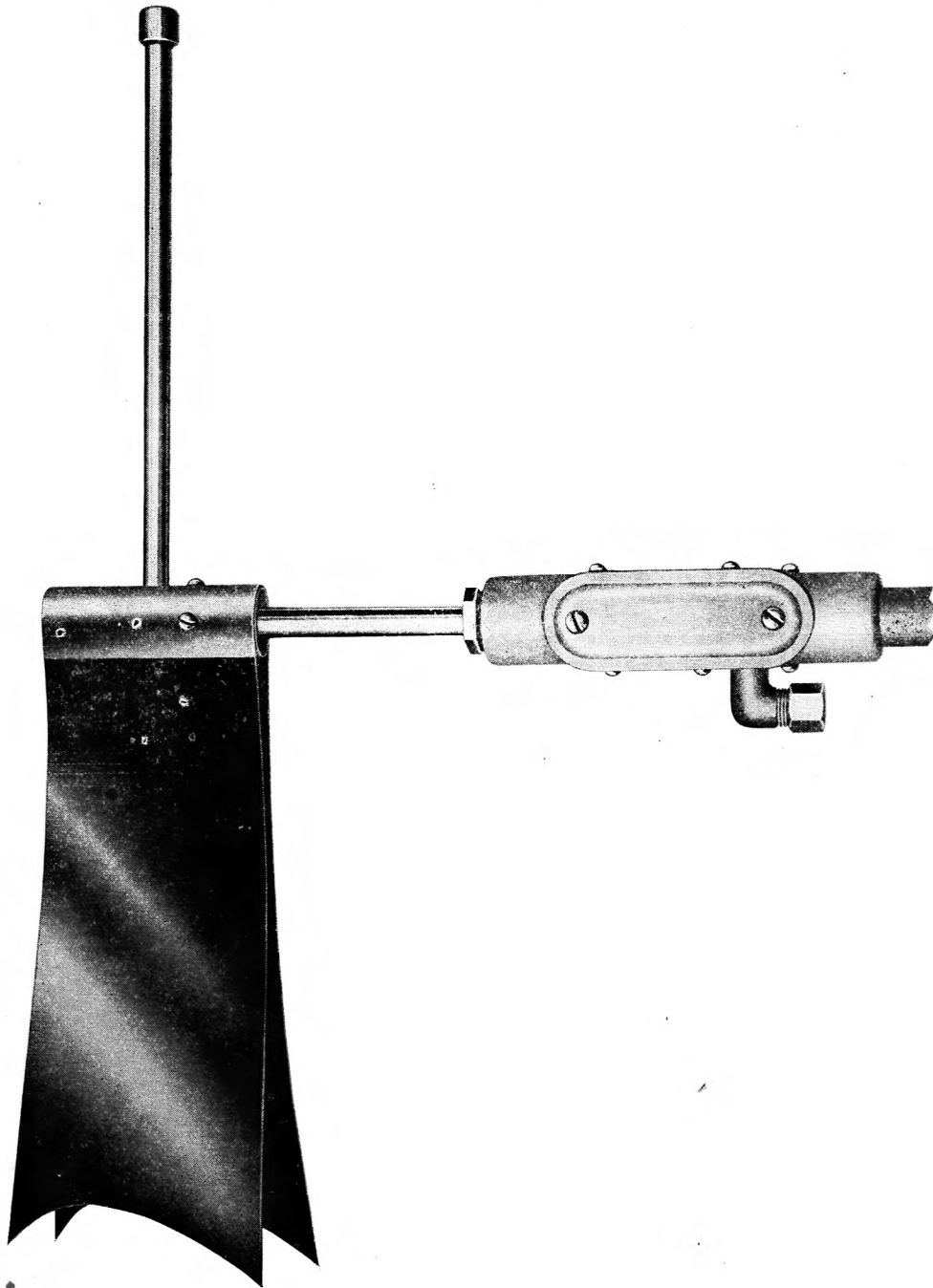
Why not get going with the wind?



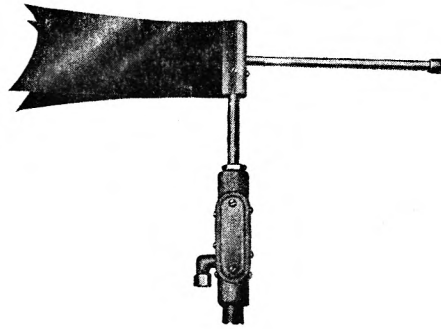
M. C. STEWART

Manufacturer ❖ 432 Massachusetts Ave. ❖ Arlington, Mass.

**ELECTRICAL DEVICES ❖ WEATHERVANES
METEOROLOGICAL INSTRUMENTS**



Electric
WIND VANE



Electric

WIND VANE

General Specifications

1. All brass, streamlined vane; permanently balanced.
2. Spread tail of vane incures suppressed oscillation, and accurate pointing in light wind.
3. Corrosion-resistant cast steel spindle box, cadmium coated, electro-galvanized, with aluminum lacquer finish.
4. Base of spindle box is threaded with standard $\frac{1}{2}$ " pipe thread, permitting easy installation by means of ordinary pipe, and pipe fittings.
5. Stainless steel spindle.
6. Self-lubricating, oilless, sleeve bearings. Instrument will run indefinitely without oil. Spindle rides on steel ball thrust bearings.
7. Only 3 moving parts. All internal mechanism and binding posts for connecting wires fully enclosed and protected from the weather, yet readily accessible for cleaning and adjustment.
8. Self-adjusting, frictionless, rolling ball contact brush with positive contact pressure. Eight-contact commutator, and individual binding posts for connecting wires.
9. Brass elbow and compression nut fitting to hold cable.
10. Repairs and repair parts obtainable at reasonable cost.

Height of instrument 12 inches.

Length of arrow 18 inches.

All prices F.O.B. Arlington, Mass., U.S.A.

Electric Wind Vane, instrument only, without Dial or cable	15.00
Compass Letters, N-E-S-W, for attachment to Electric Wind Vane, 2" brass letters on 6" brass arm with brass collar and setscrew	1.50
Cross-arm support, for Anemometer and Wind Vane, attachable to 1", 1 $\frac{1}{4}$ " or 1 $\frac{1}{2}$ " iron pipe upright with threaded end—Specify size of pipe to be used	2.00
Lead Covered Cable, 12 No. 22 conductors, color coded, per foot20
Cotton Covered Cable, 12 No. 22 conductors, color coded, for use indoors only, per foot15
Transformer, 60 cycle A.C., 110 volt primary, 6 volt secondary, 5 watt	1.75
Transformer, 25 cycle A.C., 110 volt primary, 6 volt secondary, 5 watt	3.00
Heavy duty dry batteries, slow polarizing type, extra long life, for continuous service, per set of 4	2.20

Electric
WIND VANE

Instructions

Installation

Instrument is shipped from factory completely assembled ready for installation. Unpack carefully taking special precaution against bending or damaging the spread tail of the vane. Examine instrument and make sure it has suffered no injury in transportation.

Wind instruments should be exposed where a free movement of the wind occurs, obstructed as little as possible by nearby structures or objects. This is attained by elevating the instrument as much as possible by means of vertical pipe supports or towers. At the same time the instrument must be accessible for cleaning and occasional adjustment.

Base of the spindle box is threaded to receive a standard $\frac{1}{2}$ " (American Thread) pipe fitting to hold instrument in place. Any standard $\frac{1}{2}$ " pipe fitting such as a flange plate, nipple, elbow or length of pipe can be used according to the circumstances. Use a standard pipe union in the supporting pipe; screw instrument on top section firmly, attach and connect cable, and install by joining the two sections of the pipe union. For best results the spindle should be absolutely vertical.

Electrical Connections

This instrument is designed for connection to a low voltage electric circuit operating 6 volt pilot lamps arranged on a dial. 12 wire lead covered cable, containing 12 #22 double cotton covered wires, is recommended for use with this instrument. This cable is approximately $\frac{3}{8}$ " diameter. Nine wires are required for this wind vane, three being left as spares or for connections to an anemometer when used in conjunction with it. For use indoors cotton covered cable without the lead sheath is recommended if there is considerable footage inside that is protected from the weather and dampness.

Cable should be run in a neat, secure manner from location of the instrument to the location of the dial indicator. Allow 6 or 8 inches extra at both ends for making connections. Be sure that cable is supported at frequent intervals its entire length by straps, staples, or by running through pipe or conduit. If the current supply is not near the indicator, the most practicable method is to run the cable from the instrument to a battery or transformer box, and then from the battery box to the dial indicator. Both the instrument support and exterior portion of cable should be effectively grounded in some way to reduce the hazard of lightning.

The left side of instrument box is equipped with a brass elbow and compression nut fitting to hold connecting cable. To attach cable to instrument make a circular cut around cable 6 inches from end and about half the thickness of lead sheath. Bend sharply at this point and lead sheath will break off clean and can be slipped off the end. Unscrew nut and ferrule from brass elbow on instrument box, and slip the nut and ferrule over end of cable. If cable is smaller than ferrule wrap friction tape around end of cable sheath so that ferrule fits snug. Bunch and twist slightly the 12 exposed wires putting a slight crook at outer end, then fish the 12 wires up through brass elbow into instrument box far enough to bring ferrule up into its seat and allow compression nut to be screwed on thereby holding cable firmly in place.

The dial indicator is provided with an extra socket in the center for connection to a 1/60 mile anemometer for indication of wind velocity. When an anemometer is used in conjunction with the electric wind vane, the extra wires in the wind vane cable can be used so that it is not necessary to run separate wires for the anemometer. The most practical method is to mount both instruments on the same pipe support by the use of a cross arm or tee two or three feet in length, attaching the instruments at either end with elbows. One instrument should be elevated at least 12 inches above the other to avoid mutual interference. A connecting wire may be run through the bottom of the anemometer box, through the cross arm pipe, up through the bottom of the wind vane box, and there connected to one of the extra wires in the cable. The pipe cross arm serves in this case to complete the circuit for the anemometer. Instructions for wiring through the bottom of the instrument boxes are furnished with the anemometer.

Inside the instrument box there are ten binding posts (9 insulated and 1 grounded on the box casting). Eight of these are arranged in an octagon, and these are connected to the commutator, one for each of the eight points of the compass. At the left side below the eight contacts will be found one screw slightly larger in size which is for the common wire and ground connection, and below this an extra screw for use in connecting the anemometer circuit to one of the spare wires in the cable. Measure and cut back each wire of the cable to a convenient length, skin off insulation about one quarter of an inch at end, make a right hand hook and slip hook under the head of the binding screw, then tighten screw firmly. Attach one wire to each binding post. Make a record of the color code of each wire as it is connected. Make a small coil of spare wires not used, replace the clamping cover of the box and tighten securely. Be sure to center cover on box opening and see that no bare wires project from binding posts to cause short circuits.

After the cable has been attached to the instrument and run to the point where the dial is to be located, hold or tie the vane in a true north direction. To connect the cable to the dial first determine which is the live contact (north) on the instrument by testing each of the eight wires in turn on one of the lights. Check the color code of the wire with the record made when making connections inside the instrument box. The other seven will then follow in counter clock-wise rotation according to the scheme below:

- | | | |
|-------------------|----|------------------------|
| | NW | |
| If this is North | ① | ③ West |
| | ② | |
| This is Northeast | ④ | ⑥ Southwest |
| | ⑤ | |
| East | ⑦ | ⑧ South |
| | SE | |
| | ⑨ | ⑩ Ground (Common wire) |
| | | |
| | | ⑪ For Anemometer |

Orientation

The accurate adjustment of the vane requires a knowledge of the meridian of the place where installed, and as many buildings contain a great deal of iron, and as the support is itself generally of iron, a magnetic compass cannot usually be relied upon. A true north and south line can often be established by reference to a reliable map or chart of the locality or to adjacent landmarks. Wind vanes are customarily adjusted to true north and not to magnetic north.

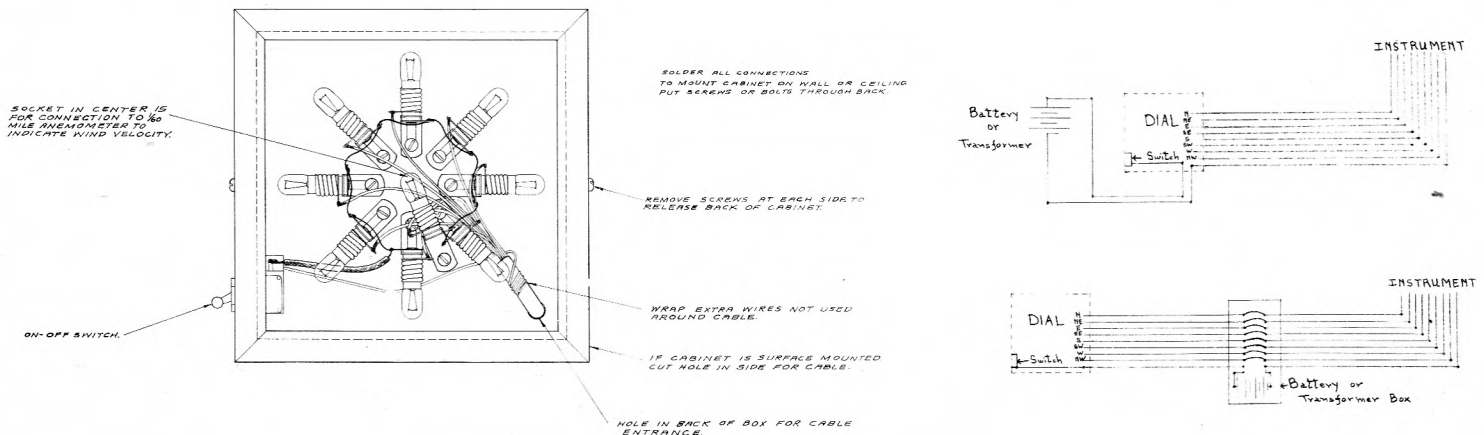
Where a true north and south line cannot be established with certainty from other information, the following method may be employed: the wind vane support being adjusted as nearly as possible to a vertical position, the shadow cast by the support on a horizontal surface, at true solar noon, will be an exact north and south line. For this purpose the observer must ascertain the exact difference between the standard time in use at his station and the true local time. To this difference must then be added or subtracted, as the case may require, the so-called equation of time, which is the number of minutes before or after local noon at which the sun passes the meridian. This information can usually be obtained upon request to a local surveyor, civil engineer, or office of the Weather Bureau.

The initial orientation of the instrument box after it is screwed on to the pipe support is immaterial as any one of the eight binding posts may serve for north or south.

Screw lamps into each of the sockets so that the filaments will be parallel to the dial face and give maximum illumination. Connect one wire from the battery or transformer to the toggle switch on the dial indicator and the seven other wires to their respective lamp sockets according to the color code of each wire as per the diagram above. Before soldering connections on the dial it is best to have someone rotate the vane so as to observe the sequence of the lights on the dial. If any transposition of the wires has occurred, it will be immediately apparent.

As a final adjustment the orientation of the instrument box should be re-checked so that when the vane is pointing exactly true north, the north contact will be equidistant from northeast and northwest contacts. A slight twist of the instrument box on the pipe support is all that is necessary to bring the northeast and northwest contacts into their proper relation with true north.

The diagrams below should be carefully studied before commencing installation of this instrument so that the installation may be fully understood.



Made in U. S. A.

M. C. STEWART

Manufacturer

ARLINGTON, MASS.



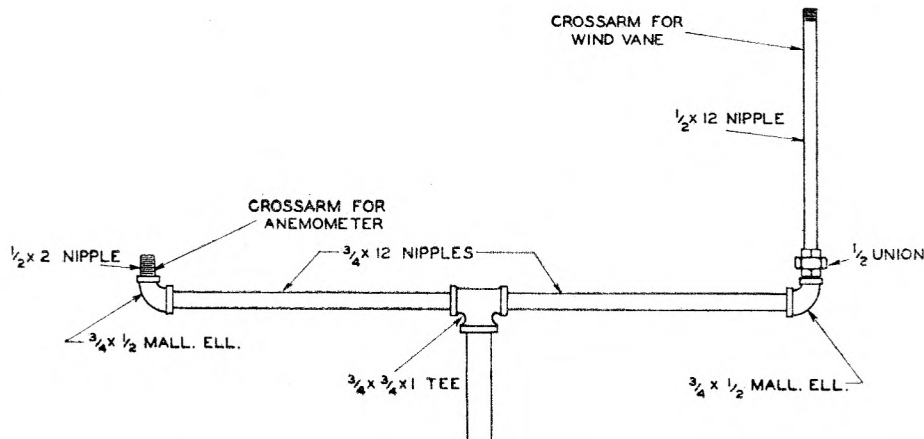
DIAL INDICATOR

FOR ELECTRIC WIND VANE

White opal plastic dial, with attractive black compass silhouette, in wood cabinet, 7" x 7" x 2", walnut finish. Indicator is equipped with 8 miniature screw base lamp sockets, on-off toggle switch, and extra socket in center of dial for wind velocity indicator, all ready for cable connections. Cabinet is suitable for shelf, mantel, or surface mounting on wall.

All prices F.O.B. Arlington, Mass., U.S.A.

Dial Indicator, for Electric Wind Vane; with box of 10-6 volt lamps	7.50
Dial Indicator, same as above, for Electric Wind Vane and Anemometer: furnished with enclosed 6 volt buzzer, adjustable tone, separate on-off switch, for audible velocity signals; with box of 10-6 volt lamps	9.00
Lead Covered Cable, 12 No. 22 conductors, color coded, per foot20
Cotton Covered Cable, 12 No. 22 conductors, color coded, for use indoors only, per foot15
Transformer, 60 cycle A.C., 110 volt primary, 6 volt secondary, 5 watt	1.75
Transformer, 25 cycle A.C., 110 volt primary, 6 volt secondary, 5 watt	3.00
Heavy duty dry batteries, slow polarizing type, extra long life, for continuous service, per set of 4	2.20



Cross-arm support, for Anemometer and Wind Vane, attachable to 1", 1 1/4" or 1 1/2" iron pipe upright with threaded end—Specify size of pipe to be used . . . 2.00

Revised and Enlarged Edition

WHY THE WEATHER ?

by **CHARLES F. BROOKS**

Director of Blue Hill Observatory, Harvard University
Secretary, American Meteorological Society

29 Chapters of Weather Facts

Observe the Weather	Autumn Foreshadows Winter
Early Spring	Autumn Winds and Storms
Moisture in the Air	Seasonal Forecasting
Clouds	Autumn Weather Proverbs
Wind and Weather	Our Atmosphere
Rain	The High Atmosphere
May Weather	Winter Storms
Some Weather Proverbs	Snow
Summer Weather	Winter Resorts and Sports
Keeping Cool in Summer	Winter Sunshine
Mountain Weather	Winter Cold
Thunderstorms	Winter in the Home
Hail, Tornadoes, Waterspouts	Aviation
Thunderstorms and the Vacationist	Radio
West Indian and other Hurricanes	Index

This fine book is authoritative in its data and its scientific background, yet is of extraordinary interest to the general reader.

295 Pages — 52 Photographs

Price \$2.50

M. C. STEWART

Manufacturer ❖ 432 Massachusetts Ave. ❖ Arlington, Mass.

ELECTRICAL DEVICES + WEATHERVANES
METEOROLOGICAL INSTRUMENTS

NORTHERN ROCKY MOUNTAIN SCALE OF WIND VELOCITY

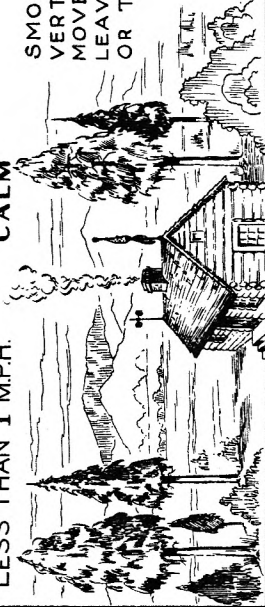
FOR USE IN ESTIMATING WIND VELOCITIES IN WESTERN MONTANA AND NORTHERN IDAHO

NORTHERN ROCKY MOUNTAIN FOREST + RANGE EXPERIMENT STATION
 TERMS USED IN U.S.W.B. FORECASTS EFFECTS OF WIND
 WIND CLASS

LESS THAN 1 MPH.

CALM

SMOKE RISES VERTICALLY; NO MOVEMENT OF LEAVES OF BUSHES OR TREES.



1 TO 3 MPH.

VERY LIGHT

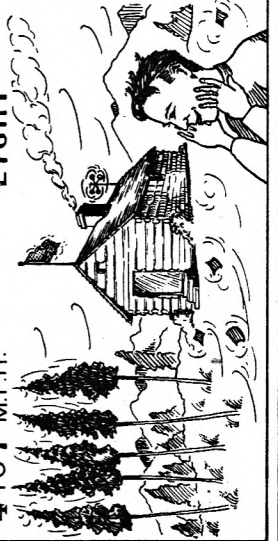
LEAVES OF QUAKING ASPEN IN CONSTANT MOTION; SMALL BRANCHES OF BUSHES SWAY; SLENDER BRANCHES AND TWIGS OF TREES MOVE GENTLY; TALL GRASSES AND WEEDS SWAY AND BEND WITH WIND; WIND VANE BARELY MOVES.



4 TO 7 MPH.

LIGHT

TREES OF POLE SIZE IN THE OPEN SWAY GENTLY; WIND FELT DISTINCTLY ON FACE; LOOSE SCRAPS OF PAPER MOVE; WIND FLUTTERS SMALL FLAG.



8 TO 12 M.P.H.

GENTLE

TREES OF POLE SIZE IN THE OPEN SWAY VERY NOTICEABLY; LARGE BRANCHES OF POLE-SIZE TREES IN THE OPEN TOSS; TOPS OF TREES IN WIND STANDS SWAY; WIND EXTENDS SMALL FLAG; A FEW CRESTED WAVES FORM ON LAKES.



13 TO 18 M.P.H.

MODERATE

TREES OF POLE SIZE IN THE OPEN SWAY VIOLENTLY; WHOLE TREES IN DENSE STANDS SWAY NOTICEABLY; DUST IS RAISED IN ROAD.



19 TO 24 M.P.H.

FRESH

BRANCHLETS ARE BROKEN FROM TREES; INCONVENIENCE IS FELT IN WALKING AGAINST WIND.

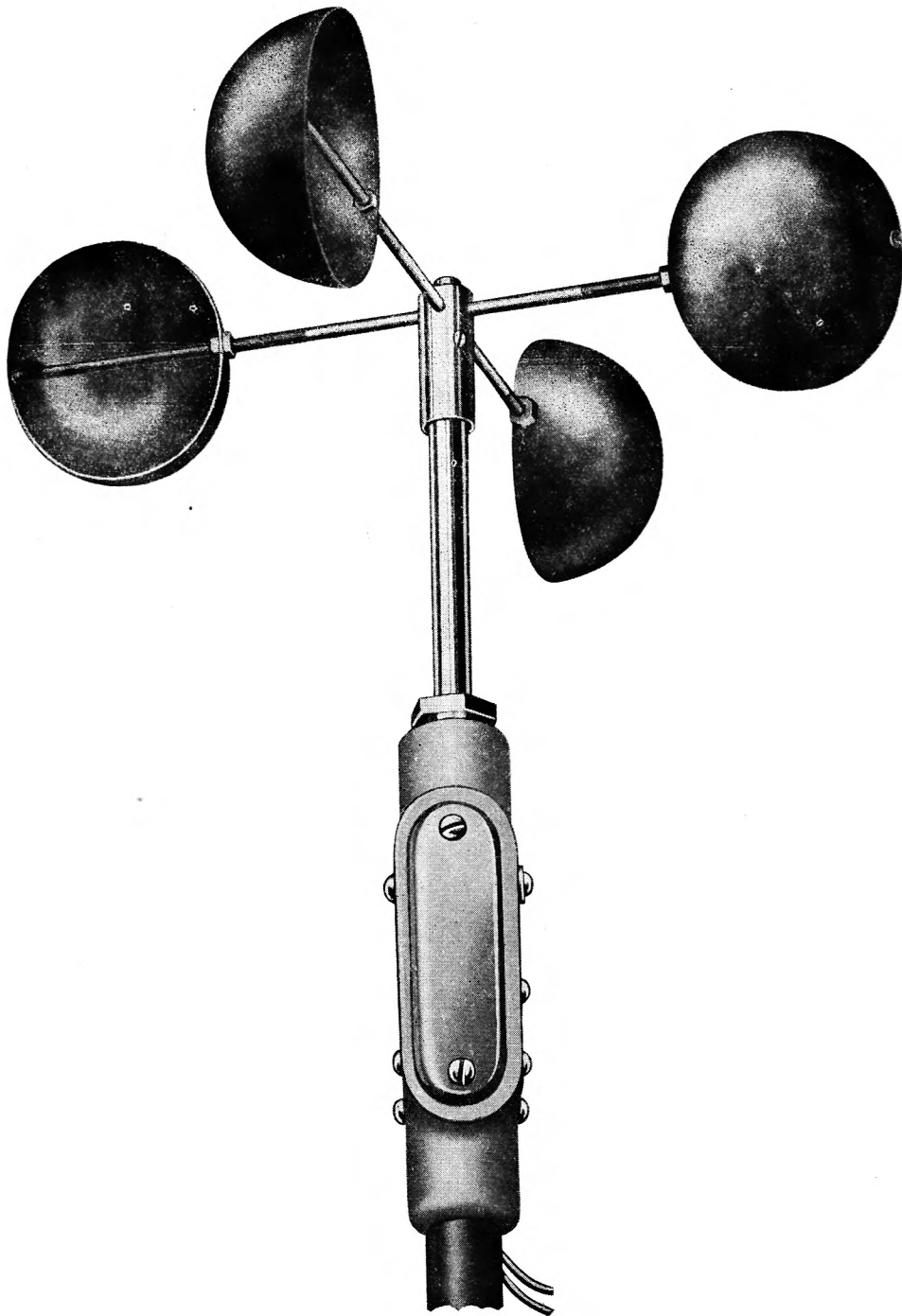


25 TO 38 M.P.H.

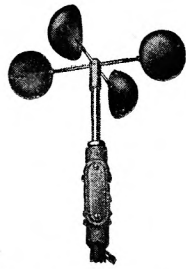
STRONG

TREES ARE SEVERELY DAMAGED BY BREAKING OF TOPS AND BRANCHES; PROGRESS IS IMPEDED WHEN WALKING AGAINST WIND; STRUCTURAL DAMAGE, SHINGLES ARE BLOWN OFF.





ANEMOMETER



ANEMOMETER

General Specifications

1. Four-cup wheel of standard design. Cup wheel replaceable without taking instrument apart.
2. Solid copper cups, riveted and lock-nutted on solid brass arms. Brass hub, and brass spindle sleeve.
3. Corrosion-resistant cast steel spindle box, cadmium coated, electro-galvanized, with aluminum lacquer finish.
4. Base of spindle box is threaded with standard $\frac{1}{2}$ " pipe thread, permitting easy installation by means of ordinary pipe, and pipe fittings.
5. Stainless steel spindle, with integral cut worm.
6. Self-lubricating oilless sleeve bearings. Oiling is never required, and operation is not affected by extremes of temperature. Spindle rides on steel ball thrust bearings.
7. Only 3 moving parts. All internal mechanism and binding posts for connecting wires fully enclosed and protected from the weather, yet readily accessible for cleaning and adjustment.
8. Electrical contacts replaceable and adjustable without taking instrument apart. Lower contact is of heavy solid silver, to resist arcing, pitting, or corrosion.
9. Guaranteed to operate 500,000 miles, and to withstand a maximum velocity of 90 m.p.h.
10. Repairs and repair parts obtainable at reasonable cost.

Height of instrument 12 inches.

All prices F.O.B. Arlington, Mass., U.S.A.

Anemometer, instrument only	\$15.00
Anemometer Signal Box, brown bakelite, $1\frac{1}{2}$ " x 3" x 5", with large brilliant translucent plastic winker light, and high grade, adjustable tone, buzzer, each with on-off switch, for 6 volt circuit	5.00
Buzzer only, 6 volt, adjustable tone, fully insulated, with chrome finished cover, each	1.00
This instrument can be furnished geared to make half-mile contacts for the operation of recorders if desired.	
Anemometer, special, with $\frac{1}{2}$ mile contacts, instrument only	\$22.50
Connection Wire, twisted pair, insulated for indoor or outdoor use, per foot03
Transformer, 60 cycle A.C., 110 volt primary, 6 volt secondary, 5 watt	1.75
Transformer, 25 cycle A.C., 110 volt primary, 6 volt secondary, 5 watt	3.00
Heavy duty dry batteries, slow polarizing type, extra long life, for continuous service, per set of 4	2.20
Brass Socket, 1" diameter, single center hole, with 2" brass wood screw or bolt, for mounting instrument on top of mast or flagpole50

ANEMOMETER

Instructions

Instrument is shipped from factory completely assembled. Unpack carefully, taking special precaution against bending or damaging the cups or cup arms. Examine carefully and make sure no damage has occurred in transportation.

Installation

Wind instruments should always be exposed where a free movement of the wind occurs, obstructed as little as possible by nearby structures or objects. Elevate the instrument by means of a vertical pipe support or tower. If mounted on the roof of a building the instrument should be elevated above the highest point of the roof a distance sufficient to avoid eddy currents and the shadowing effect of chimneys, cornices, cupolas, gables, etc. If mounted on the ridge of a sloping roof instrument should be elevated four feet to six feet or more to avoid the effect of the strong up-current caused by the slope of the roof. When the anemometer is exposed with a wind vane one instrument should be at least twelve inches above the other to avoid mutual interference.

The velocity of natural wind will be found to increase with an increase in height of the instrument above ground. In many cases this increase varies as the square root of the altitude.

Base of the spindle box is threaded with a standard $\frac{1}{2}$ " American Pipe Thread. Any standard $\frac{1}{2}$ " pipe, or fitting such as a flange plate, nipple, union, elbow, or length of pipe, can be used according to the circumstances. The instrument should be screwed on securely, making sure that spindle is absolutely vertical, and that the support is as free from vibration as possible.

Electrical Connections

Instrument is designed for connection to a low voltage electric circuit operating a flash or buzzer indicator. Instrument is wired at the factory with two short lengths of wire which protrude diagonally down through the back of the spindle box. One of these wires is red and the other is green. The red wire is the hot wire and is connected to the insulated part of the contact mechanism inside the box. The green wire is grounded to the box inside.

Insulated connecting wires should be spliced onto these short lengths and run in a neat manner to the location of the indicator or current supply, or splices may be avoided by running the connecting wires directly into the box, care being taken to attach the ends to the binding posts in the same manner as the short lengths of wire which are removed.

The green, or ground, wire should also be connected to ground, or the pipe support grounded if practicable, as this reduces somewhat the hazard of lightning. A good ground connection will in many cases obviate the necessity of running two wires to the instrument, one wire (the hot wire) being all that is needed.

If it is desired to run the connecting wire through the bottom of the box and down inside the supporting pipe, the short lengths of wire should be removed and the diagonal holes should be plugged with paint, tar, solder, etc. The connecting wire should then be slipped through the two holes in the brass rings that support the lower bearing assembly. Enough left hand twist should be given the wire below the box to facilitate screwing the box on its support.

The current supply can be obtained from any practical source such as dry batteries, wet batteries, storage battery, or bell-ringing transformer. The voltage should be kept as low as possible, never exceeding 8 volts. Use only sufficient current to operate the indicator satisfactorily, as excessive current will cause arcing and undue wear of the contacts. The lower contact screw is adjusted so that the revolving contact on gear wheel wipes very gently across its face, no movement of the supporting spring being perceptible. Avoid too much pressure or excessive wear will occur. Contact screws should be kept clean.

Lubrication - - - NEVER USE OIL OR GREASE ON THIS INSTRUMENT AT ANY TIME.

This instrument is equipped with self-lubricating oilless bearings at both upper and lower end of spindle, and the entire spindle rides on four ball thrust bearings at the lower end. Instrument is thoroughly lubricated at the factory and can be placed in service at once. Lubrication is obtained by the use of super-refined flake graphite, and the instrument will operate several years without attention.

Every two or three years remove the cup wheel and clean it carefully and also clean the top of spindle sleeve and inside of wheel hub. Be careful not to get any dust or dirt into the top bearing. A small quantity of super-refined flake graphite can then be blown into the top bearing, the lower bearing, and on the worm gear, and this will insure continued trouble-free operation for many years.

Repairs

Repairs, repair parts, lubricating graphite, or additional copies of these instructions may be obtained on request to the manufacturer.

Made in U. S. A.

M. C. STEWART

Manufacturer

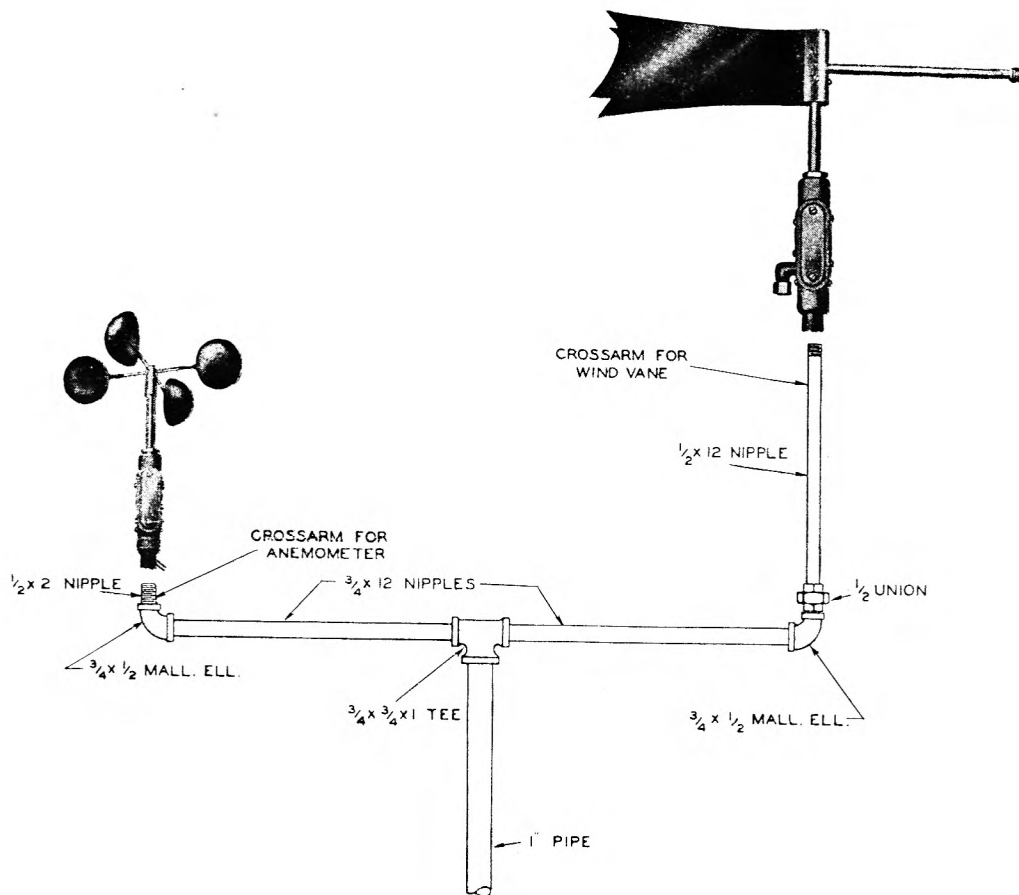
ARLINGTON, MASS.

Calibration

The calibration of this instrument is as follows:

Number of contacts per minute, plus or minus the following factors, equals true wind speed in miles per hour, to within an accuracy of 1 mile per hour.

1 to 9	- plus	1
10 to 39	- zero	0
40 to 49	- minus	1
50 to 59	- minus	2
60 to 69	- minus	3



The above arrangement is recommended for mounting instruments on a pipe or flagpole.

CROSSARM FOR ANEMOMETER

CROSSARM FOR WINDVANE

WINDVANE ELEVATED 12 ABOVE ANEMOMETER

WIRE ROPE CLAMPS

ENTIRE TOWER SHOULD BE PAINTED AFTER ERECTION.

40' OF $\frac{1}{4}$ GALV. WIRE ROPE FURNISHED

3 COMPLETE SETS OF GUYS & FITTINGS FURNISHED.

STEPS

9'-0"

WIRE ROPE CLAMPS

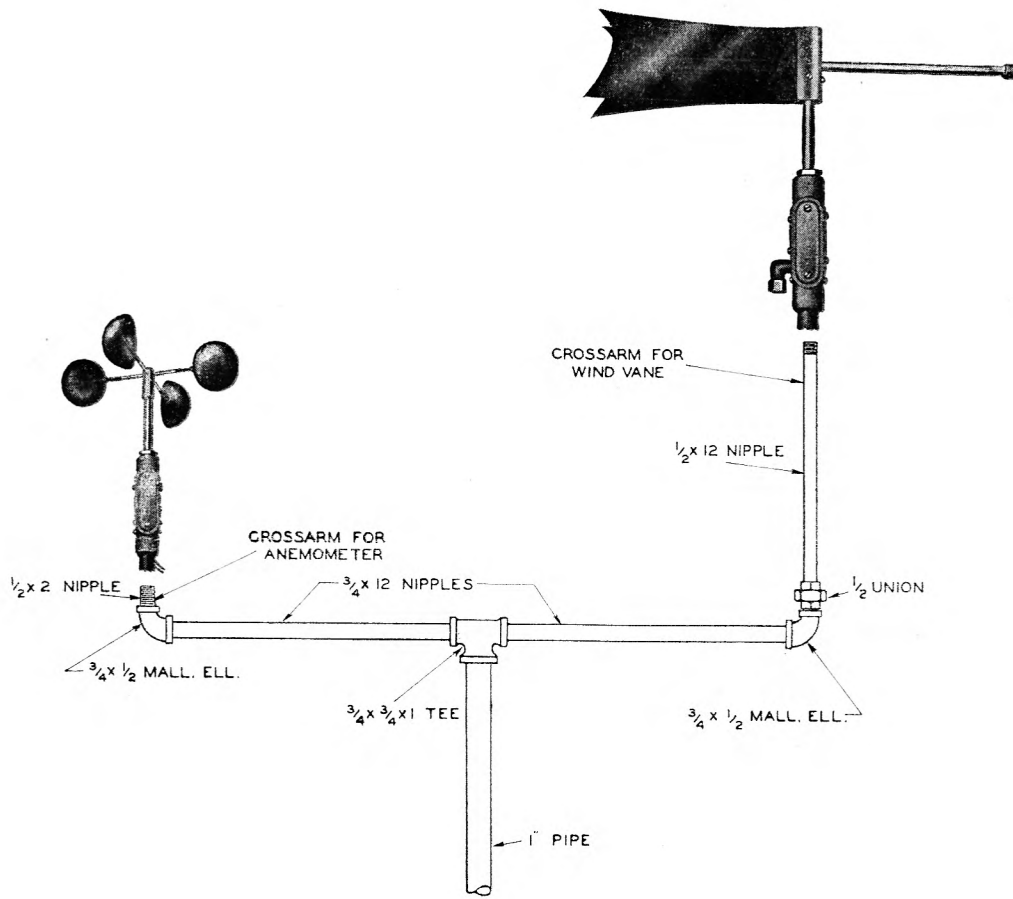
TURNBUCKLE 4" TAKEUP

ROOFPLATE DRILLED FOR $\frac{1}{4}$ BOLTS.

BASEPLATE DRILLED FOR $\frac{1}{4}$ BOLTS

TOWER SUPPORT

FOR WIND INSTRUMENTS



PIPE SUPPORT for Wind Instruments

The above arrangement is recommended for mounting instruments on a pipe or flagpole.

SUPPORTS

FOR WIND INSTRUMENTS

TOWER SUPPORT

Tower support made of extra heavy galvanized steel tubing, in 3 ft. sections. Furnished complete with base plate, steps, 3 roof plates with guy wires, guy wire clamps and turnbuckles, and crossarms for Anemometer and Wind Vane. All parts galvanized. Shipped knocked down, in sections ready for erection.

Tower Support, in 3 ft. sections, 9 ft. high	30.00
Tower Support, in 3 ft. sections, 12 ft. high	34.00
Tower Support, in 3 ft. sections, 15 ft. high	38.00
Tower Support, in 3 ft. sections, 18 ft. high	42.00

PIPE SUPPORT

PIPE SUPPORT, same as above except lighter weight, 5 ft. sections.

10 ft. Support	\$ 20.00
Extra sections, up to 40 ft.,	per foot \$ 1.00

All prices F.O.B. Arlington, Mass., U.S.A.

Comparative Chart of Wind Velocities

DESCRIPTION	Velocity (Miles per hour)	CHARACTERISTICS
Calm	Less than 1	Smoke rises vertically.
Light	1 to 3 4 to 7	Direction of wind shown by smoke drift, but not by wind vanes. Wind felt on face; leaves rustle; ordinary vane moved by wind.
Gentle	8 to 12	Leaves and small twigs in constant motion; wind extends light flag.
Moderate	13 to 18	Raises dust and loose paper; small branches are moved.
Fresh	19 to 24	Small trees in leaf begin to sway; crested wavelets form on inland waters.
Strong	25 to 31 32 to 38	Large branches in motion; whistling heard in telegraph wires; umbrellas used with difficulty. Whole trees in motion; inconvenience felt in walking against the wind.
Gale	39 to 46 47 to 54	Breaks twigs off trees; generally impedes progress. Slight structural damage occurs (chimney pots and shingles removed).
Whole gale	55 to 63 64 to 75	Trees uprooted; considerable structural damage occurs. Rarely experienced except in coastal regions or high altitudes; accompanied by wide-spread damage.
Hurricane	Above 75	(The highest natural wind velocity ever officially recorded occurred at the summit of Mt. Washington, N. H., April 12, 1934. Maximum: 231 m.p.h.; total 24 hour wind movement: 3,095 miles; average: 129 m.p.h.)

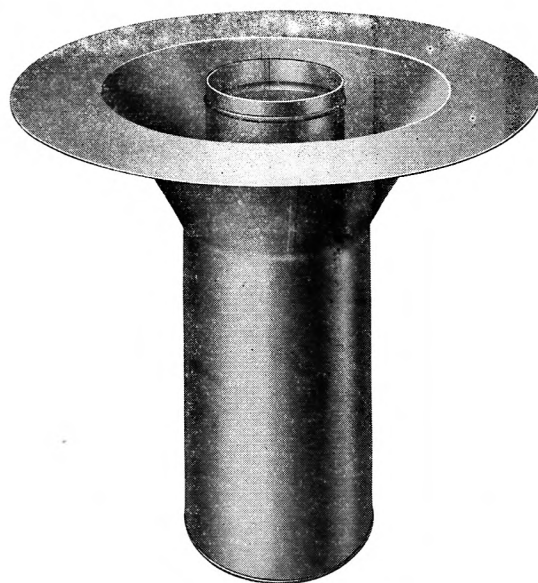
The above table of velocity equivalents is derived from the Beaufort scale.

M. C. STEWART

Manufacturer ❖ 432 Massachusetts Ave. ❖ Arlington, Mass.

ELECTRICAL DEVICES + WEATHERVANES
METEOROLOGICAL INSTRUMENTS

RAIN GAGE WITH WINDSHIELD



The Stewart Rain Gage consists of a standard size 8" container, with funnel receiver and inner container or measuring tube. The gage is entirely surrounded by a Nipher type windshield, flush with the top and bottom of the gage. The 8" container serves as an overflow receiver, or a snow gage when funnel and inner measuring tube are removed.

All ordinary unshielded gages catch and measure too little rainfall, the deficit (varying from 5% to 50% or more) increasing with the strength of the wind and the height of the gage above ground. With a shielded gage the catch is very nearly uniform under all conditions.

The windshield is aero-dynamically designed to eliminate turbulence and eddy currents and to smooth out the flow of wind over the mouth of the gage so that a true sample of the precipitation is caught.

The rain gage and windshield are mounted together in a cradle support (not illustrated) which can be screwed on top of a 1 1/2" iron pipe driven into the ground.

The gage and shield are of heavy galvanized sheet metal, ruggedly built for years of service. The inner measuring tube is made of heavy copper. Both gage and shield are thoroughly sprayed with aluminum paint, weatherproof, and attractive in appearance.

Measuring stick and complete instructions for installation and method of measurement are furnished.

- Rain Gage with Windshield, and Cradle Support attachable to 1 1/2" iron pipe, complete \$35.00
- Windshield only, and Cradle Support attachable to 1 1/2" iron pipe (can be used to shield a standard 8" rain gage) 22.50

PRIVATE WEATHER STATION

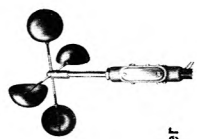
COMPLETE EQUIPMENT \$ 85.00



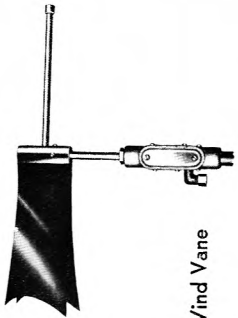
Maximum-Minimum Registering Thermometer



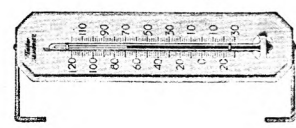
Barometer



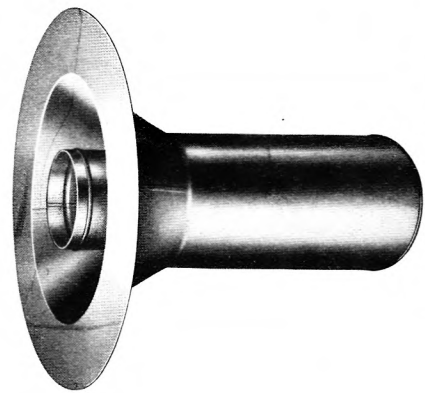
Anemometer



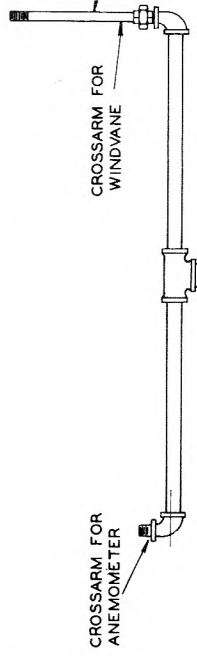
Electric Wind Vane



Window Thermometer



Rain Gage with Windshield, and Cradle Support

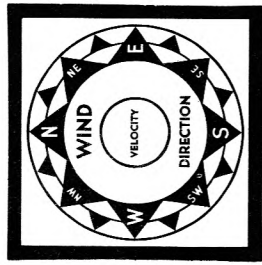


CROSSARM FOR ANEMOMETER

CROSSARM FOR WINDVANE

Cross-arm support, for Anemometer and Wind Vane, attachable to 1", 1 1/4", or 1 1/2" iron pipe upright with threaded end—Specify size of pipe to be used

Transformer, 60 cycle, 110 volt primary, 6 volt secondary,
or
Heavy duty dry batteries, extra long life, for continuous service, set of 4
50 ft. Lead Covered Cable, 12 No. 22 conductors,



Dial Indicator

1 Copy "Why the Weather", 295 page book with 52 photographs, by Dr. Charles F. Brooks, Director of Blue Hill Meteorological Observatory.
1 large Wall Chart of Cloud Forms (12 photographs) with brief description of cloud types.
1 Copy "Weather Forecasting", 35 page booklet illustrated with tables, maps and diagrams.
1 Copy "Cloud Forms", 24 page booklet with 32 photographs, international system of classification.

Total list price for this equipment \$100.00
Because the cost of handling one order for a single delivery is less than for handling several orders aggregating the same amount, the above equipment can be offered at a substantial saving of 15.00
Private WEATHER STATION Net Price \$ 85.00

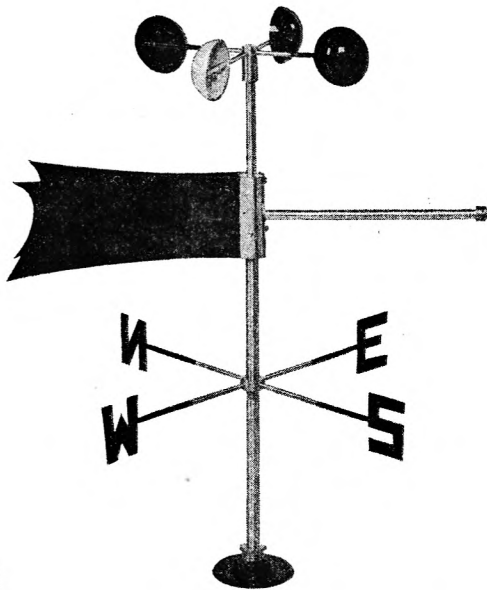
Additional Cable or other equipment ordered with above, furnished at proportionate discount.

Just the thing for garage, garden, barn, tennis court, camp, or boat house!

FLYING ZEPHYR

WEATHERVANE

This fascinating device shows visibly *both* direction and relative speed of the wind at all times. A source of unfailing interest to young and old, with many exclusive features not found in any other weathervane.



Varying rotation of the anemometer cup wheel shows changes in the velocity of the wind instantly. One cup is colored white and three black so that motion is easily observable. Cup wheel turns freely on stainless steel spindle, bronze ball-bearings; self-lubricating oilless sleeve bearing, inside weatherproof sleeve.

Distinctive arrow is unmistakably visible in any position. Spread tail insures accurate pointing in the lightest breeze.

Crossarms with directional letters lock in place by unique method without setscrews and cannot loosen.

Strongly made of brass and copper with 10 weatherproof ball-bearings.

Base is equipped with standard $\frac{1}{2}$ " threaded pipe fittings, permitting easy installation anywhere.

\$10.00

Height 18", crossarms 15", arrow 18",
cup wheel 9" diameter.

Attractive, modern, stream-lined design is patterned after standard instruments. Please note that this weathervane has no electrical mechanism, being made for visual observation only.

There is endless fascination in watching the graceful motion of this weathervane, through rain or shine, snow or sleet, as it goes merrily on its way.

Spirited as a lark, stout-hearted as an eagle, the "Flying Zephyr" shows you every variation in the direction or velocity of the wind.

Built for long service and fully guaranteed. Enjoy it all the year round!

M. C. STEWART

ARLINGTON, MASS.

MANUFACTURER

WIND - BAROMETER TABLE

Barometer	Wind from	Weather Indicated
Very High - Stationary	SW to NW	Continued fair, little change in temperature.
Very High - Falling Slowly	SW to NW	Fair, slowly rising temperature, 36 to 48 hours.
High - Steady	SW to NW	Fair, with little change in temperature, for 1 to 2 days.
High - Rising Rapidly	SW to NW	Fair, followed within 1 to 2 days by rising temperature and rain.
High - Falling Slowly	SW to NW	Rising temperature, rain in 24 to 36 hours.
High - Falling Rapidly	SW to NW	Rising temperature, rain in 18 to 24 hours.
High - Falling Slowly	S to SE	Increasing cloudiness, rain within 24 hours.
High - Falling Rapidly	S to SE	Rain in 12 to 24 hours, with increasing wind.
High - Falling Slowly	SE to NE	Cloudiness, precipitation in 12 to 18 hours.
High - Falling Rapidly	SE to NE	Increasing wind with rain in 12 hours.
High - Falling Slowly	E to NE	In summer, with light winds, probably fair. In winter, precipitation in 24 hours.
High - Falling Rapidly	E to NE	In summer, rain probably in 12 to 24 hours. In winter, rain or snow, with increasing wind.
Medium - Falling Slowly	SE to NE	Rain, continuing 1 to 2 days.
Medium - Falling Rapidly	SE to NE	Rain, with high winds, followed by clearing and lower temperatures.
Medium - Rising Slowly	S to SW	Clearing, followed by fair weather.
Low - Falling Rapidly	S to E	Severe storm with wind and heavy precipitation followed by clearing, lower temperatures.
Low - Falling Rapidly	E to N	Strong Northeast storm with heavy rain or snow, followed in winter by cold wave.
Low - Rising Rapidly	Going to W	Clearing, with lower temperatures.

Low barometer, at sea level, 29.80 inches or below
 Medium barometer, 29.80 to 30.00 inches
 High barometer, 30.00 to 30.20 inches
 Very high barometer, 30.20 inches and above

The above table summarizes in general the weather indications for the United States.

M. C. STEWART

Manufacturer ♦ 432 Massachusetts Ave. ♦ Arlington, Mass.

ELECTRICAL DEVICES ♦ WEATHERVANES
METEOROLOGICAL INSTRUMENTS

WIND GAGE

An inexpensive indicator of wind direction and velocity.



Counterbalanced vane on universal pivot swings both horizontally and vertically. Ideal for wind pennant or tell-tale on sailing craft. Operates perfectly regardless of inclination of spindle, has exceptional sensitivity, and is clearly visible from any angle.

Horizontal motion indicates wind direction. Vertical motion indicates wind Pressure on under side of vane.

With 4-arm spider attached, giving visual reference lines, wind directions are very accurately indicated.

Sensitivity of vane to wind pressure is adjustable over a wide range by shifting of the lead counterbalance.

Especially valuable for observing gusty, variable winds.

All brass, with adjustable lead counterbalance, stainless steel pivot and spindle, and self-lubricating oilless spindle bearing.

Furnished with hexagonal pipe bushing and 3" flange plate for mounting.

Can also be furnished with brass socket, $\frac{7}{8}$ " diameter — single center hole for screw or bolt, for mounting on top of mast or flagpole. When ordering please specify whether flange or socket mounting is desired.

Aluminum lacquer finish. Height 8 inches.

Wind Gage, complete with brass socket, or flange, for mounting	3.25
Brass 4-arm Spider, for attachment to Wind Gage, with brass collar and setscrew (no letters), extra75

ON GOVERNMENT APPROVED LIST
THE AERO STORES
 LARGE STOCKISTS OF
 AIRCRAFT ACCESSORIES & AVIATORS' REQUISITES
 170, NABER ROAD,
 KARACHI CITY.

Your Ref. Air Mail 25th February 1938

M. C. Stewart Esq.,
 Manufacturer,
 Arlington, Mass.

MOTEURS MARINES "GRAY" - MOTEURS AVIATEURS "EVINRUDE" & "ELTO" - MOTEURS "DIESEL"
 EMBARCATIONS STANDARDES "MERMAL" & "POLICE" "FEDERAL-MOULU" "BIENEX" "MAXIM"
 PENTURES MARINES "SMITH" "DECE" "SOL" "COMMANDE" A DISTANCE "PNEUSELECTOR"
 CONVERSIONS MARINES "MOTOCYCLE" "TRANSMISSIONS"
GARCIEL NAUTIQUE
 TOUTES LES FOURNITURES MARINES CHAUSSEE DE MALINES 43 - ANVERS

Antwerp, the 21st October 1937.

Messrs. M. C. STEWART,
 Arlington, 74,
 MASS.,
 U.S.A.

HARVARD UNIVERSITY
 BLUE HILL METEOROLOGICAL OBSERVATORY
 WESTON, MASSACHUSETTS
 Oct. 10, 1938

Mr. M. C. Stewart
 Box 74
 Arlington, Mass.

Dear Mr. Stewart:

It might interest you to know that one of your anemometers belonging to Mr. Greenleaf W. Pickard, was timed during the recent hurricane to a velocity of 86 miles an hour for a period of half a minute, in which Mr. Pickard counted 43 clicks; another half minute showed a speed of 78 miles an hour.

LA CHALONETTE
 MIRAMAR D'ESTEREL
 PAR THEULLE de France
 N. 24/1938

*M.C. Stewart
 412 Massachusetts Ave
 Arlington, Mass
 Dealer*

With reference to your advertisement in the Puddle, will you please forward me to yacht "Helonia" of American Registry, Port de Cannes A.M. France, one of your electric wind vane anemometers.

FRANK G. HAUGHWOUT
 P. O. BOX 428
 MANILA, P. I.

11th August, 1938.

Mr. M. C. Stewart,
 Arlington, Mass., U.S.A.

Dear Sir:

Rev. Miguel Selga, S. J., director of the Philippine Weather Bureau, has kindly called my attention to the fact that you manufacture wind recording apparatus that is modern.

DOMINION OF NEW ZEALAND.
 NEW ZEALAND GOVERNMENT OFFICE
 415, STRAND,
 LONDON, W.C.2.

24th March, 1939.

Dear Sir,
 State Forest Service Memo. 1/12 of 1.3.39.
 Order No. 280688.

I am directed by the High Commissioner to inform you that he has been requested by his Government to purchase

C.A. MURRAY
 L.L. ROBINSON
 311 MECHANIC STREET
 HONOLULU, HAWAII

February 24, 1939

MARINE SUPPLY COMPANY
 JOHNSON OUTBOARD MOTORS - MARINE HARDWARE
 YACHT SUPPLIES AND ACCESSORIES - KORE
 CHAIN & PARTS AND OILS

ORDER NO. 3745

M. C. Stewart
 Arlington, Mass.

Dear Sir:

Kindly send us at your earliest opportunity one (1) only Flying Zephyr Weatherfans C.O.D.

TELEGRAPHIC ADDRESS: "YACHTING (P)C" LONDON
 ESTABLISHED 1875.
GEORGE WILSON & Co. (LONDON) LTD.
 The London Yachting Stores
 YACHTING HOUSE,
 36, Gt. Pulteney Street, Piccadilly Circus,
 LONDON, W.1.

14th April, 1939.

M. C. Stewart, Esq.,
 412 Massachusetts Ave.,
 Arlington, Mass.

Dear Sirs,

We shall be glad if you will send us another 3 anemometers also one of your electric wind vane. This letter is for a London man who knows your products quite well and has asked us whether we are worth

BERTRAM WOK
 "GREAT GARANT"
 WARTWICK - BERMLUDA

February 21, 1938

M. C. Stewart
 Arlington, Mass.

Dear Sir:

The anemometer arrived and is working very well. As a result several of my friends have asked me to procure some for them. Accordingly please send as before.

INFORMAL QUOTATION FOR ARTICLES OR SERVICES

DEPARTMENT OF COMMERCE
 LIGHTHOUSE SERVICE
 Address all correspondence to "Department of Lighthouses"
 314 Madison Street, Albany, N.Y. 12212

Office on Screen Government of Louisiana, 9th District, January 25, 1939

412 Massachusetts Ave., Arlington, Mass.

Dear Sir:

Please quote in your lowest price and best terms of delivery on the articles listed below, delivery to be made to Port of Light House, Sea View, Puerto Rico ALL ORDERS FORWARD

Your reply to reach this office not later than as soon as possible, 19

UNITED STATES DEPARTMENT OF THE INTERIOR
 OFFICE OF INDIAN AFFAIRS
 432 Massachusetts Ave., Arlington, Mass.

TO: M. C. Stewart, Arlington, Mass.

10-131
 432 Massachusetts Ave., Arlington, Mass.

U. S. DEPARTMENT OF THE INTERIOR
 NATIONAL PARK SERVICE
 432 Massachusetts Ave., Arlington, Mass.

ORDER BLANK

October 14, 1937

CFCO
 W.W. PITT HOTEL
 P. O. BOX 25
 CHATHAM, ONTARIO
 April 17, 1939

M. C. Stewart
 Arlington, Mass.

Dear Sir:

UNITED STATES DEPARTMENT OF AGRICULTURE
 SOIL CONSERVATION SERVICE
 432 Massachusetts Ave., Arlington, Mass.

TO: M. C. Stewart, Arlington, Mass.

10-131
 432 Massachusetts Ave., Arlington, Mass.

U. S. DEPARTMENT OF THE INTERIOR
 NATIONAL PARK SERVICE
 432 Massachusetts Ave., Arlington, Mass.

ORDER BLANK

October 14, 1937

DEPARTMENT OF MINES AND RESOURCES
 PH/CO
Purchase Order
 File No. 51980-3-16

M. C. Stewart, Esq., 432 Massachusetts Ave., Arlington, Mass.

Please forward the following to the address given below, and charge to account of the Department of Mines and Resources.

Render a separate invoice for each order and send 5 copies to Domestic Forester, Norlita Bldg., Ottawa - when goods are shipped.

REYMON AGENCIES
 335 MURRAY STREET, FIFTH FLOOR, TELEPHONE 88000

M. C. Stewart
 Arlington, Mass. U. S. A.

MOUNT WASHINGTON OBSERVATORY
 GORHAM NEW HAMPSHIRE

October 25, 1937

M. C. Stewart, Esq., 432 Massachusetts Ave., Arlington, Mass.

Dear Sir:

The anemometer that you sent us has been repaired and is now in working order. We are very pleased with the results of the repairs.

DEPARTMENT OF MINES AND RESOURCES
 PH/CO
Purchase Order
 File No. 51980-3-16

M. C. Stewart, Esq., 432 Massachusetts Ave., Arlington, Mass.

Please forward the following to the address given below, and charge to account of the Department of Mines and Resources.

Render a separate invoice for each order and send 5 copies to Domestic Forester, Norlita Bldg., Ottawa - when goods are shipped.

E. GRØNVOLD MEYER
 STABLETT 1206
 OPTISK & NAUTISK FORRETNING
 TOLLBOGG 6
 VERKETTER TELEFONER: FORRETNINGEN 1932
 PRIVAT 2287

Oslo, 25/5 1939

M. C. Stewart
 Arlington, Mass. U. S. A.

DISTRIBUIDORES, S. A.
 JOBBERS IN ELECTRICAL EQUIPMENT AND MECHANICAL SUPPLIES
 Havana, Cuba

TO: M. C. STEWART
 ARLINGTON, MASS.

Please enter our order for prompt shipment of the following material observing carefully all instructions:

Ship direct to US
 Via EXPRESS D-5050-S
 Mark top and ends of packages
 Mail two copies of Invoice and Packing List DIRECT TO US.
 Send ORIGINAL Invoice and SIX copies with ORIGINAL Bill of Lading to US

Item	QUANTITY	DESCRIPTION OF MATERIAL	U. S. C.
A	1	Electric Ind Vane	\$ 15.00
B	1	Anemometer	15.00
C	1	Dial indicator	7.50
			\$ 37.50

DEPARTMENT OF MINES AND RESOURCES
 PH/CO
Purchase Order
 File No. 51980-3-16

M. C. Stewart, Esq., 432 Massachusetts Ave., Arlington, Mass.

Please forward the following to the address given below, and charge to account of the Department of Mines and Resources.

Render a separate invoice for each order and send 5 copies to Domestic Forester, Norlita Bldg., Ottawa - when goods are shipped.

Quantity	DESCRIPTION	REMARKS
10, only	Anemometers, Stewart, improved type	LONDON CORINTHIAN SAILING CLUB, LOWER BALL, HAMBERSMITH.
10 "	Indicator boxes, bakelite, for air with 6 volt winch light &	December 5th, 1937.
1 "	Wind vane, electric	M. C. Stewart, Esq.
1 "	Dial indicator for wind vane with 10 pilot lamp	

Dear Sir, I thank you for your prompt attention, and the instrument arrived intact, and has been fully installed, working off a chain transformer to three points in the Club. The anemometers are extremely pleased with it, and as compliment you on a beautifully made job.

I have pleasure in enclosing you draft, will you let me have details of your other goods.

Thank you,
 Yours faithfully,
 J. G. Anderson
 Vice-Comodore

Enclosure.

E. GRØNVOLD MEYER
 STABLETT 1206
 OPTISK & NAUTISK FORRETNING
 TOLLBOGG 6
 VERKETTER TELEFONER: FORRETNINGEN 1932
 PRIVAT 2287

Oslo, 25/5 1939

M. C. Stewart
 Arlington, Mass. U. S. A.

Dear Sir:

The harbour and pilot office in Alesund want anemometer type B. complete. Price \$ 15.- cost of transportation to Alesund. The instrument is wanted as seen as possible.

We beg you have the kindness to draw upon us for the amount through Alesunds Nye Kreditbank, Alesund Norway.

Yours Faithfully,
 E. Grønvold Meyer

STEWART

WIND INSTRUMENTS

are found -

the world around !

