The calibration setup is essentially the same as FIG. 1 with the exception of the tape recorder. The double integrator controls are set as follows:

wave period — $T<12$ seconds

meter sens. — 0.5 ft/div.

The procedure is simply to oscillate the buoy and adjust the Cal. Adj. on the double integrator until the meter reads the known displacement. The meter sens. switch is then moved to Cal. position and the meter reading noted. This meter reading is then associated with the serial number of the buoy.

When a trial is conducted, the correct sensitivity is then easily set. The serial number of the buoy will be known. With the Meter Sens. switch Cal. position, the Cal. Adj. is adjusted until the meter reads the value obtained during primary calibration.

Although wave height estimates made by observers on board ship are usually quite inaccurate, wave length and period can be judged with reasonable accuracy — Rossel, H. E. and Chapman, L. B.: "Principles of Naval Architecture," Vol. II, pages 2–8, 1949. This fact is used to set the wave period switch in the correct position. The predominant wave period is first estimated by observation and the wave period switch is then placed in the next highest position. The wave period is then checked by timing the wave height meter swing and the wave period switch repositioned if necessary. For example, the wave period may be estimated to be 4.5 seconds by observation. So the wave period switch is placed in the $T<5$ position. If after timing the period of the wave height meter swing it was found to be closer to 6 seconds, the wave period switch should be repositioned to the $T<8$ position.

The double integrator unit **18** may be used as previously described to obtain sea state information. In addition to a wave displacement signal, it is also possible to obtain a wave vertical velocity signal at the output of the first integrator, should it be desired. It may well be that in practice other forms of readout may be more suitable than the analog meter **20** (FIG. 1). A large variety of readouts are possible. However, adaptation of a particular readout should present no problem since the difficult task of performing the real time integration is complete with analog velocity and displacement signals provided.

One problem remaining is that of finding the buoys after a trial since they are free floating and may be separated by several miles. The simplest solution appears to be the use of a unidirectional antenna. Commercial units such as that of Communication Products Company, Catalog No. 206–509 are available or a transmitter-hunt-loop-see The A.R.R.L. Antenna Book, Ninth Edition, page 312 — may be constructed for the purpose.

What is claimed is:

1. Wave measuring apparatus for determining information relating to waves on the surfaces of a liquid comprising:

a wave buoy capable of providing a signal representative of the motion of the buoy when floating on the liquid;

receiving means for receiving said signal;

discriminator means having an input terminal connected to an output terminal of said receiving means;

integrator means having an input terminal connected to an output terminal of said discriminator means, said intergrator means having differentiator means including a capacitor connected to its input terminal in series with its input signal; and

indicator means connected to an output terminal of said integrator means to provide an indication of the output therefrom indicative of the said wave information.

2. Wave measuring apparatus for determining the wave height of waves on the surface of a liquid comprising:

a wave buoy capable of providing a signal representative of the motion of the buoy when floating on the liquid;

receiving means for receiving said signal;

discriminator means having an input terminal connected to an output terminal of said receiving means;

integrator means having an input terminal connected to an output terminal of said discriminator means, said integrator means having differentiator means including a capacitor connected to its input terminal in series with its input signal; and

indicator means connected to an output terminal of said integrator means to provide an indication of the output therefrom indicative of the said wave height.

3. Wave measuring apparatus according to claim **2** wherein said integrator means includes a double integrator unit.

4. Wave measuring apparatus according to claim **2** wherein said discriminator means is a frequency meter and discriminator unit.

5. Wave measuring apparatus according to claim **4** wherein said integrator means includes two integrator circuits whereby a double integration operation is performed on the input signals fed to the integrator whereby a substantial portion of wave buoy tilt energy is removed from the output of the integrator means.

6. Wave measuring apparatus according to claim **5** wherein said double integration operation includes integration for frequencies falling on the negative slope and differentiation for frequencies on the positive slope of the characteristic of said integrator means.

7. Apparatus for measuring vertical accelerations comprising in combination:

accelerometer means for generating an output signal whose frequency is proportional to vertical acceleration;

receiving means for receiving and demodulating the output of said accelerometer means;

means for standardizing the output signal of said receiving means with respect to all characteristics except frequency;

filter means for receiving the output of said standardizing means and blocking out a predetermined band of low frequencies, including D.C; and

double integrator means for integrating the output of said filter means, said double integrator means operating to integrate only those of its input signals having a frequency above a predetermined frequency.

8. Apparatus as in claim **7**, wherein said integrator means acts to differentiate those of its input signals