the current conveyor circuit used in the detecting circuit of the capacitive sensor according to the embodiments of the invention. In **FIG. 13**, the current conveyor circuit **300** is a four-terminal network circuit having input terminals X and Y and output terminals Z+ and Z−.

[**0101**] In the current conveyor circuit **300**, in which currents flowing into the input terminals X and Y are referred to as iX and iY respectively, and currents flowing into the output terminals Z+ and Z− are referred to as iZ+ and iZ− respectively, the current flowing into the terminal X becomes equal to the current flowing into the output terminal Z+ (iZ+=iX), the voltage vX of the input terminal X becomes equal to the voltage vY of the input terminal Y (vX=vY), and they remain constant. In addition, no current flows into the input terminal Y (iY=0) and the current iX is drawn out from the output terminal Z−.

[**0102**] **FIG. 14** shows a basic structure, in which the current conveyor circuit **300** is used in the detecting circuit of the capacitive sensor. In **FIG. 14**, SG denotes a signal source, more particularly, a pulse signal output from a driving circuit for driving the vertical electrode. Even though both of C**1** and C**2** are capacitances formed by the vertical wiring lines and the horizontal wiring lines, C**1** is a capacitance to be detected by the horizontal wiring lines, and C**2** is a capacitance of the other wiring lines. However, in the example, the horizontal wiring line for noise detection is not taken into account. C**2** has a higher value than C**1** and the maximum value of (the maximum value of C**1**)×Ln when the number of vertical wiring lines is n. C**3** is a capacitance for detecting-voltage maintenance, and S**2** and S**2** are switches. S**1** is turned off when the sensor does not detect the fingerprint and turned on when the sensor detects the fingerprint. S**2** is a reset switch for discharging remaining charges when the fingerprint is detected.

[**0103**] In the above structure, when the fingerprint is detected, the switch S**2** is turned on, and thus the remaining charges of the capacitance C**3** for signal-detecting are discharged. And then, the switch S**2** is turned off, and the switch S**1** is turned on. In this case, if a pulse signal is output from the SG and a signal corresponding to the unevenness of the fingerprint is input via the capacitance for signal-detecting C**1**, a current corresponding to the detected signal flows into the input terminal X of the current conveyor circuit, and a current having the same value as the detected current flows into the capacitance for detecting-voltage maintenance via the switch S**1** from the output terminal Z+, and thus the signal voltage is maintained.

[**0104**] Next, **FIGS. 15 and 16** show examples of the detecting circuits using the current conveyor circuit taking into account a case that noises are input via the gap capacitance C**10** formed between the finger and the horizontal electrodes and the parasitic capacitance C**11** formed between the finger and the horizontal wiring line for noise detection when the fingerprint is detected. In **FIGS. 15 and 16**, NG is a source of noise, more particularly, noises flowed in from the finger when the finger comes in contact with the sensor unit of the capacitive sensor. The detecting circuit shown in **FIG. 15** is operated in a current mode. In **FIG. 15**, another current conveyor circuit **301** is provided in addition to the circuit structure of **FIG. 14**.

[**0105**] The output of the noise source NG is connected to the input terminal X of the current conveyor circuit **300** via the gap capacitance C**10** and to the input terminal X of the current conveyor circuit **300** via the parasitic capacitance C**11**. The output terminal Z+ of the current conveyor circuit **300** and the output terminal Z− of the current conveyor circuit **301** are connected with each other.

[**0106**] In **FIG. 15**, the noise current output from the noise source NG flows into the input terminal X of the current conveyor circuit **300** via the gap capacitance C**10** and into the input terminal X of the current conveyor circuit **301** via the parasitic capacitance C**11**. As a result, the common currents flow into the input terminals of the current conveyor circuits **300** and **301**, thereby the currents reversely flow through the output terminal Z+ of the current conveyor circuit **300** and the output terminal Z− of the current conveyor circuit **301** at the same current value, and noises can be removed from the output terminal of the detecting circuit.

[**0107**] Next, **FIG. 16** shows an example of the detecting circuit operated in a voltage mode using the current conveyor circuit. In the detecting circuit shown in **FIG. 16**, comparing with the detecting circuit shown in **FIG. 15**, the current conveyor circuit **301** is removed, and the output of the noise source NG is connected to the input terminal Y of the current conveyor circuit **300** via the parasitic capacitance C**11** of the horizontal wiring line for noise detection.

[**0108**] In the above structure, the noise currents output from the noise source NG flow into the input terminal X of the current conveyor circuit **300** because the input terminal X is in a low impedance, however, no currents flow into the input terminal Y because the input terminal Y is in a high impedance. As a result, the charged voltage of the gap capacitance C**10** due to the noise currents and the charged voltage of the horizontal wiring line for noise detection have reversed polarities each other, thereby noises can be removed from the input terminal of the current conveyor circuit **300**.

[**0109**] As described above, according to the invention, a pressure-sensitive capacitive sensor capable of easily removing noises delivered from a human body can be obtained.

1. A pressure-sensitive capacitive sensor, comprising:

a sensor unit including a first substrate where a plurality of vertical wiring lines is formed and a second substrate where a plurality of horizontal wiring lines is formed, the first and second substrates being disposed in a matrix and facing each other with a gap interposed between the first and second substrates, and capacitances at intersections between the vertical wiring lines and the horizontal wiring lines changed in response to an external pressure; and

a detecting unit for detecting a change in the capacitances at the intersections between the vertical wiring lines and the horizontal wiring lines, and detecting an externally applied pressure distribution based on the detecting result,

wherein a horizontal wiring line for noise detection is disposed on a surface where the horizontal wiring lines of the second substrate are formed.