using a material such as polyimide. Flexible conductor traces **98** may be formed using a material such as copper. Other materials may be used as known in flexible circuit technology. The thinness of the flexible conductor allows the switch output leads **36** and the adapter block input pins **88** to be shorter than normal plug or jack pins—for example less than 0.13" long.

The flexible circuit **82** has a first end **100** configured for connection to the switch leads **36**, and a second end **102** configured for connection with the adapter input pins **88**. Each connection point comprises a hole **104** surrounded by the conductor **98**. The holes **104** may sized for an interference fit on the pins **36**, **88**. This fit holds the circuit ends **100**, **102** in place after being pressed onto the pins **36**, **88**, at which time the pins **36**, **38** may be soldered or mechanically attached to the surrounding conductors **98**.

Cut-outs **106** may be provided between the ribbon portion **95** and an end portion **100** as shown. This allows the adjacent bend **108** of the ribbon portion **95** to start sooner, shortening the length of the ribbon portion **95** that is needed for assembly. Non-contact holes **110** in an end portion **102** of the flexible circuit may be provided in conjunction with holes **111** (FIG. **11**) through the adapter block **80** for pressure relief, application of potting material, or other purposes.

FIG. **10** is a perspective view of the embodiment **20**A of FIG. **8**. The coupler **24** may include a mechanism **112** for interlocking with threads and/or latches on the respective coupler of the client plug. FIG. **11** is a connector-end view of the embodiment of FIG. **8**, showing nine exemplary pin-out conductors identified by the letters A-I. FIG. **12** shows end **102** of the flexible circuit configured for six active pin-out conductors B, C, D, F, G, and H of FIG. **11** for a double-pole double-throw configuration of the switch **20**A. FIG. **13** shows end **102** of the flexible circuit configured for three active pin-out conductors B, C, and D of FIG. **11** for a single-pole double-throw configuration of the switch **20**A. Adapter input pins **88** may be eliminated for conductors A and I as shown for conductor **94** in FIG. **8**. An input pin **88** may be provided for conductor E for mechanical connection even though it is electrically inactive. These are just examples of a possible pin-out configurations and options.

Benefits of the flexible circuit **82** and adapter block **80** include: 1) Provides an integrated connector adapter for an existing client cable plug; 2) Provides a flexible connection between the connector adapter block **80** and the switch leads **36** without a mess of wires; 3) Reduces the possibility of an assembly mistake; 4) Allows easy rewiring of the pin-out configuration with a simple change of circuit traces; 5) Provides a simple connection to the connector adapter in a short space without external adapters.

While various embodiments of the present invention have been shown and described herein, it will be obvious that such embodiments are provided by way of example only. Numerous variations, changes and substitutions may be made without departing from the invention herein.

The invention claimed is:

1. A proximity switch for monitoring the operating position of a mechanical device and selectively opening and closing an electrical circuit in response thereto, the switch comprising:
- inner and outer shafts in a housing;
- a first spring that urges the inner shaft away from a sensor end of the housing;
- a magnet on the inner shaft that moves the inner shaft toward the sensor end of the housing against the urging of the first spring when a magnetic target is proximate the sensor end of the housing;
- a second spring in the housing interposed between the inner and outer shafts;
- a lock selectively allowing or preventing relative movement between the outer shaft and the housing;
- a moveable electrical contact on the outer shaft moveable with the outer shaft between first and second positions in engagement with a respective first or second fixed electrical contact in the housing;
- wherein a movement of the inner shaft in either a first or second direction in response to a movement of the target relative to the sensor end of the housing causes the second spring to urge the outer shaft in a direction of the movement of the first shaft, and then releases the lock allowing the second shaft to move as urged by the second spring to move the moveable electrical contact between the first and second positions, and then causes the lock to reengage to secure the movable electrical contact in its engaged position and prevent movement thereof relative to the respective fixed electrical contact.

2. The switch of claim **1**, wherein;
- the outer shaft is slidably mounted within the housing;
- the inner shaft is slidably mounted within the outer shaft;
- the magnet urges the inner shaft leftward when the target is proximate the sensor end of the housing, wherein "leftward" and "rightward" mean toward or away from the sensor end of the housing respectively;
- the first spring urges the inner shaft rightward;
- the second spring pushes rightward or leftward on the outer shaft via respective right or left guide pins in response to respective rightward or leftward movement of the first shaft; and
- the lock prevents movement of the outer shaft until the second spring is compressed by the movement of the inner shaft, then the lock is moved by an engagement pin on the inner shaft, which releases the lock allowing the outer shaft to snap rightward or leftward as urged by the second spring, closing or opening the movable contact against corresponding ones of the fixed electrical contacts.

3. The switch of claim **1**, further comprising;
- a shaft support that is fixed within the housing;
- wherein the outer shaft slides within the shaft support, and the inner shaft slides within the outer shaft;
- wherein the lock comprises left and right locking claws with respective pivot axles fixed to the shaft support, wherein "left" and "right" mean toward or away from the sensor end of the housing respectively;
- wherein the left and right locking claws are urged by respective third and fourth springs on the shaft support to hook respective left and right locking posts attached to the outer shaft; and
- wherein an engagement pin on the inner shaft opens alternative ones of the locking claws by contacting it and pivoting it away from the respective locking post, releasing the outer shaft to move as urged by the second spring.

4. The switch of claim **3**, further comprising:
- left and right spring blocks slidably mounted in a chamber for the second spring in the inner shaft, wherein the second spring spans between the spring blocks; and
- left and right guide pins on the respective spring blocks, wherein the guide pins extend through an inner guide slot in the inner shaft into an outer guide slot in the outer shaft;
- wherein rightward movement of the inner shaft moves the left spring block rightward, compressing the second spring and causing the right guide pin to push rightward against a right end of the outer guide slot; and