

Patent on theft prevention on electrical power lines

Patent on **System and method for detection and prevention of accidents, faults and unauthorized withdrawal or theft of electrical power on power lines or power feeder; automation of electrical power distribution** (Indian Patent No. 225783) has been awarded to Dr. Lalit Mohan Saini from Electrical Engineering Department. The co-inventor of this patent is Sh. Palani Rakesh Kumar. The abstract and other info about patent is available at official web site of Indian patent office at the following link:

[http://124.124.193.235/patentgrantedsearch/\(S\(0tImul45fawvogv2pi1frm45\)\)/displayApplication.aspx?application_number=665/DEL/2007](http://124.124.193.235/patentgrantedsearch/(S(0tImul45fawvogv2pi1frm45))/displayApplication.aspx?application_number=665/DEL/2007)

The complete specification (without figures) is available on official web site of Indian patent office at the following link:

[http://124.124.193.235/patentgrantedsearch/\(S\(0tImul45fawvogv2pi1frm45\)\)/completeSpecification.aspx?ID=665/DEL/2007](http://124.124.193.235/patentgrantedsearch/(S(0tImul45fawvogv2pi1frm45))/completeSpecification.aspx?ID=665/DEL/2007)

The system requires one unit each to be placed on the two ends of the power line being protected in addition to a signal wire running along the feeder, connecting the two units. For subscriber feeder, the unit at the subscriber end should be incorporated in the energy meter of the subscriber and the other unit need to be placed at the point of common coupling. In this regard three type of systems have been developed for single phase as well as three phase power feeders. All the three systems bring automation in power distribution system with variable capabilities. They are:

i) Basic system: Low cost, analog system, detects and prevents power theft/ fault/ accident immediately on any of the three type of locations (Main feeder, Subscriber feeder, Point of common coupling). De-energizes power line on which theft or fault (L-G, LL-G, LLL-G, L-L, L-L-L) or any accident occurs. Automatically restores power immediately when theft/fault/accident is removed. Extremely fast system, reduces distribution losses to NIL. Very effective on subscriber individual feeder. Detects fault, theft in less than one-fourth of a cycle. Approx. price of each unit of 1-phase is Rs. 300/- and that of 3-phase is Rs. 900/-. The prototype for Basic system are ready for demonstration and their demo videos are available through internet at the following links:

<http://www.youtube.com/watch?v=xisk0RFF0Xw&feature=youtu.be>

(3-phase Electricity theft prevention using Basic system)

<http://www.youtube.com/watch?v=hF3q7Fd-PU8&feature=youtu.be>

(1-phase Electricity theft prevention using Basic system)

ii) Enhanced system: Digital system, detects and reports amount and place of power theft to utility, communicates amount and place of power theft to concerned officials as well as higher officials in hierarchy and also stores the information in a database at the substation. Very effective on main feeder as well as at point of common coupling. Has capability to detect and prevent theft on subscriber feeder, detect theft on main feeder and inform utility personnel about it, recording of events in computer database in the utility substation/ office, monitor and control loading of transformers, multi-tariff billing of consumer loads, energy consumption, monitor power flow from neighbouring utility, monitor power, energy drawn by subscriber and its power quality at any instant, feeder maintenance, load balancing and management, capacitor bank energization capabilities, deliver bill, account information, power quality of load, energy consumed, load energy

profile, messages to subscriber in electronic form, provide pre-paid capability in the system, remotely energize/ de-energize any feeder under its control, remote control of street lights without any additional feeder. It requires one wireless communication connection per distribution transformer besides enhancement in ordinary energy meter and one unit per end of feeder connecting at PCC. Detects fault, theft in more than one cycle.

iii) Further enhanced system: Combination of Basic and Enhanced system to deliver best capabilities of both. Requirements: Same as that of Enhanced system with advanced units having capability to provide features of Basic and Enhanced system. Features: Detects and prevents theft on subscriber feeder and faults on any of the three type of locations using Basic system. Provides all the features of Enhanced system. Very effective on any of the three type of locations.

Implementation of the above system will reduce unaccounted losses to the minimum and will also bring accountability of losses. The technology will benefit a common man as one will have to pay for only the energy consumed by oneself and not for the unaccounted losses. It can be implemented by various utilities in the country. The technology is ready for transfer and equipment based on this technology can be manufactured by various distribution equipment manufacturers.