Claims:

1. A process performed by a smart cylinder, comprising:

receiving a key;

emitting an energy source of electromagnetic radiation;

detecting a change in the energy source due to a physical property of the key;

determining the physical property of the key from the change in the energy source;

comparing the physical property with a predetermined value;

engaging a mechanism operatively coupled to a locking device that allows the locking device to unlock when the physical property matches the predetermined value;

engaging the mechanism through an electromagnetic device at least partially housed in the smart cylinder; and

powering the smart cylinder with energy generated in the electromagnetic device when configured to function as a generator.

2. The process of claim 1 wherein the energy source is light.

3. The process of claim 1 wherein the physical property of the key is the shape of the key.

4. The process of claim 1 wherein the key is designed to work in any combination of a traditional pin-tumbler, a wafer-tumbler, a disc-tumbler, and a lever-tumbler.

5. The process of claim 1, further wherein the energy source is emitted from an energy emission array and wherein the change in the energy source is detected in an energy detection array.

6. The process of claim 1 wherein the energy source is polarized in a polarizing filter.

7. The process of claim 1 wherein the energy source is unique to a particular smart cylinder.

8. The process of claim 1 wherein the key is received in a keyway.

9. The process of claim 1 wherein the change in the energy source is measured in a two-dimensional array of sensors.

10. The process of claim 1 wherein the physical property of the key is the shape of two or more sides of the key.

11. The process of claim 1 wherein the process is performed in a smart cylinder that is designed to fit into a traditional and standardized lock cylinder.

12. The process of claim 1 wherein the change in the energy source is measured in one or more of a pixel sensor, a MXene photodetector, a charged couple device, a Medipix sensor, a complementary metal oxide semiconductor sensor, a photodiode sensor, and a photo-pixel array.

13. The process of claim 1 wherein the change in the energy source measures one or more of the properties of reflection of light off the key, capacitance of an area of the key, and conductivity of an area of the key.

14. A smart cylinder, comprising:

a plug body comprising an energy emitter and an energy detector; and

a control module operatively coupled to the energy emitter and the energy detector configured to

emit an energy source of electromagnetic radiation from the energy emitter,

detect a change in the energy source due to a physical property of a key as received in the energy detector,

determine the physical property of the key from the change in the energy source,

compare the physical property of the key with a predetermined value, and

engage a mechanism operatively coupled to a locking device that allows the locking device to unlock when the physical property matches the predetermined value wherein the mechanism operatively coupled to the locking device is an

electromagnetic device at least partially housed in the smart cylinder , wherein the control module is powered from stored energy generated in the electromagnetic device when the electromagnetic device is configured to function as a generator.

15. The smart cylinder of claim 14 wherein the energy source is light.

16. The smart cylinder of claim 14 wherein the physical property of the key is the shape of the key.

17. The smart cylinder of claim 14 wherein the key is designed to work in any combination of a traditional pin-tumbler, a wafer-tumbler, a disc-tumbler, and a level-tumbler.

18. The smart cylinder of claim 14 wherein the energy emitter is comprised of an energy emission array and the energy detector is comprised of an energy detection array.

19. The smart cylinder of claim 14 wherein the energy source is polarized in a polarizing filter.

20. The smart cylinder of claim 14 wherein the energy source is unique to a particular smart cylinder.

21. The smart cylinder of claim 14 wherein the plug body further comprises a keyway.

22. The smart cylinder of claim 14 wherein the change in the energy source is measured in a two-dimensional array of detectors.

23. The smart cylinder of claim 14 wherein the physical property of the key is the shape of two or more sides of the key.

24. The smart cylinder of claim 14 wherein the smart cylinder is configured to fit into a traditional and standardized lock cylinder.

25. The smart cylinder of claim 14 wherein the energy detector is measured in one or more of a pixel sensor, a MXene photodetector, a charged couple device, a Medipix sensor, a complementary metal oxide semiconductor sensor, a photodiode sensor, and a photo-pixel array.

26. The smart cylinder of claim 14 wherein the change in the energy source measures one or more of the properties of reflection of light off the key, capacitance of an area of the key, and conductivity of an area of the key.

27. An electronic lock system, comprising:

a smart cylinder further comprising

a plug body comprising an energy emitter and an energy detector;

a control module operatively coupled to the energy emitter and the energy detector configured to

emit an energy source of electromagnetic radiation from the energy emitter,

detect a change in the energy source due to a physical property of a key as received in the energy detector,

determine the physical property of the key from the change in the energy source,

compare the physical property of the key with a predetermined value, and

engage a mechanism operatively coupled to a locking device that allows the locking device to unlock when the physical property matches the predetermined value wherein the mechanism operatively coupled to the locking device is an electromagnetic device at least partially housed in the smart cylinder, wherein the control module is powered from stored energy generated in the electromagnetic device when the electromagnetic device is configured to function as a generator; and

a control system configured to provide the predetermined value to the control module.

28. The electronic lock system of claim 27 wherein the energy source is light.

29. The electronic lock system of claim 27 wherein the physical property of the key is the shape of the key.

30. The electronic lock system of claim 27 wherein the key is designed to work in any combination of a traditional pin-tumbler, a wafer-tumbler, a disc-tumbler, and a level-tumbler.

31. The electronic lock system of claim 27 wherein the energy emitter is comprised of an energy emission array and the energy detector is comprised of an energy detection array.

32. The electronic lock system of claim 27 wherein the energy source is polarized in a polarizing filter.

33. The electronic lock system of claim 27 wherein the energy source is unique to a particular smart cylinder.

34. The electronic lock system of claim 27 wherein the plug body further comprises a keyway.

35. The electronic lock system of claim 27 wherein the change in the energy source is measured in a two-dimensional array of detectors.

36. The electronic lock system of claim 27 wherein the physical property of the key is the shape of two or more sides of the key.

37. The electronic lock system of claim 27 wherein the smart cylinder is configured to fit into a traditional and standardized lock cylinder.

38. The electronic lock system of claim 27 wherein the energy detector is measured in one or more of a pixel sensor, a MXene photodetector, a charged couple device, a Medipix sensor, a complementary metal oxide semiconductor sensor, a photodiode sensor, and a photo-pixel array.

39. The electronic lock system of claim 27 wherein the change in the energy source measures one or more of the properties of reflection of light off the key, capacitance of an area of the key, and conductivity of an area of the key.