

POWER OPERATED LOCKING SYSTEM EARTH MOVING EQUIPMENT  
AND METHOD International Application No.: PCT/CA2018/050271 Filed  
March 7, 2018

CLAIMS LIST JUNE 2018:

1. A shovel for earth moving equipment of the type having a shovel lip and a plurality of ground engaging teeth removably attached to said lip and characterized by:
  - a plurality of tooth mounts on said shovel lip;
  - a plurality of teeth releasably carried on respective said tooth mounts, said teeth each defining a hollow interior cavity adapted to fit over respective said tooth mounts;
  - a lock receiving recess in each said tooth mount;
  - power operated tooth locks received in respective said lock receiving recesses, said power operated tooth locks incorporating a moveable lock member, and an electrical power operated drive operable in response to an individual coded signal to drive a respective said lock member between two positions;
  - a lock receiving socket accessible within said hollow interior of each said tooth, and oriented to register with a respective said lock receiving recess; and,
  - a remote control device operable to send respective coded signals by wireless to respective said electrical power operated drives to operate a respective said power operated drive in a respective said power operated tooth lock.
2. The shovel for earth moving equipment as claimed in Claim 1 and further characterized by a drive gear rack attached to each said moveable lock member, a drive gear

connected with said gear rack, and an electrical motor coupled to said drive gear, located within said power operated tooth lock.

3. The shovel for earth moving equipment as claimed in Claim 2 and further characterized by said power operated tooth lock is contained entirely within the tooth mount, and wherein said moveable lock member is moveable by remote operation of said electrical motor and drive gear, to move said lock member into and out of engagement in said lock receiving socket in said tooth.
4. The shovel for earth moving equipment as claimed in Claim 3 and further characterized by said tooth mounts are fastened securely to said shovel.
5. The shovel for earth moving equipment as claimed in Claim 3 and further characterized by tooth adaptors removably attached to respective said tooth mounts.
6. The shovel for earth moving equipment as claimed in Claim 3 and further characterized by respective teeth are mounted on respective said tooth mounts on said shovel.
7. The shovel for earth moving equipment as claimed in Claim 3 and further characterized by said lock receiving recesses being formed in side portions of said tooth mounts, and along axes normal to the longitudinal axis of each said tooth mount, and wherein said lock receiving sockets are formed interiorly in each said tooth, aligned along axes normal to the longitudinal axis of each said tooth, and located whereby to be aligned with respective said lock receiving recesses in said tooth mounts when said teeth are slid over respective said tooth mounts.
8. The remotely operable power operated tooth lock for securing a plurality of individual separate teeth on respective separate tooth mounts on a ground engaging system each

said tooth lock being concealed wholly within a respective pair of a tooth mount and tooth, and characterized by:

a lock housing body adapted to be placed in one of a said tooth and a said tooth mount of said ground engaging system;

a lock member slideably secured in said lock housing body;

a drive transmission means connected to said lock member, operable to extend and retract said lock member relative to said lock housing body;

a wireless responsive electrical motor operable in response to an individual coded wireless transmission to control said drive transmission means; and,

a remote wireless controller operable to send a specific respective coded signal to each respective said tooth lock, and operate its respective said wireless responsive electrical motor.

9. The remotely operable power operated tooth lock as claimed in Claim 8 and further characterized by said tooth mount defines a lock receiving recess, and wherein said tooth defines a hollow interior adapted to fit over said mount and a lock receiving socket accessible within said hollow interior of said tooth, for receiving said lock member from said lock housing body.

10. The remotely operable power operated tooth lock as claimed in Claim 9 and further characterized by said lock member is attached to a gear rack, and including a drive gear engaged with said gear rack, said drive gear being responsive to operation of said motor for extension and retraction of said lock member relative to said lock housing body.

11. The remotely operable power operated tooth lock as claimed in Claim 10 and further characterized by said tooth mounts are fastened securely to said ground engaging system.

12. The remotely operable power operated tooth lock as claimed in Claim 11 and further characterized by tooth adaptors removably attached to respective said tooth mounts.

13. The remotely operable power operated tooth lock as claimed in Claim 12 and further characterized by respective teeth are mounted on respective said tooth adaptors.

14. The remotely operable power operated tooth lock as claimed in Claim 8 including lock receiving recesses formed in respective said tooth mounts, said lock receiving recesses being formed in side portions of said tooth mounts, and along axes normal to the longitudinal axis of each said tooth mount, and wherein said lock receiving sockets are formed interiorly in each said tooth aligned along axes normal to the longitudinal axis of said tooth, and located whereby to be aligned with a respective said lock receiving recesses in said tooth mount when said tooth is slid over said tooth mount.

15. A method of remotely securing a tooth on a tooth mount on a ground engaging shovel and characterized by:

forming said tooth mount with an internal lock receiving recess;

forming a tooth with a hollow interior defining a lock receiving socket;

placing a tooth lock in said recess in said tooth mount, said tooth lock having a lock member, slideably secured in a lock housing body, and operable in response to an internally located electrical motor, to move said lock member,

placing a tooth defining a hollow interior over said tooth mount and over said tooth lock,  
said tooth defining a hollow interior with a lock receiving socket,  
aligning said lock receiving socket with said tooth lock housing recess in said tooth  
mount, and  
operating said wireless responsive motor by a remote wireless controller exterior to said  
tooth mount and said tooth.