

What is Claimed:

1. An egg candling and relocation apparatus, comprising:
 - a. a user interface;
 - b. an entrance, an egg candling area, an egg staging area and an exit;
 - c. supports configured to receive and permit the conveyance of a tray holding a plurality of eggs;
 - d. one or more conveying means, for conveying the trays from the entrance, to the candling area, to the egg staging area, and to the exit;
 - e. an egg candling energy means, for directing energy at the plurality of eggs;
 - f. an energy detection means, for detecting the energy that passes through the plurality of eggs and for converting the transmitted energy into a signal;
 - g. a signal processing means, for determining from the signal at least one status of one or more eggs;
 - h. a robot, comprising a working arm equipped with one or more flexible cups, for picking up and relocating eggs based upon their status, wherein the robot is mounted onto the apparatus such that its range of motion permits its working arm and flexible cup(s) to pick up any of the plurality of eggs while the tray is in the candling area; and
 - i. a robot controller, an electrical controller, and a pneumatic controller, wherein each controller is electrically connected to the user interface; andwherein the apparatus is optionally equipped with a single-, 6-, or 42-egg remover head.
2. The apparatus of claim 1, wherein when an egg tray is loaded into the entrance of the apparatus and moved into the candling area, the candling energy means directs an egg candling energy at the eggs;

wherein energy that passes through the eggs is detected by the detection means and converted into at least one status signal by the signal processing means;

wherein the status signal is transmitted to the robot controller, and in response, the robot controller directs the robot to pick up and relocate eggs having a selected status, as determined by the signal processing means; and

wherein the apparatus comprises a four finger pusher that is configured to slide beneath the tray and engage with the tray to move the tray laterally, toward the apparatus exit; wherein when the four finger pusher slides beneath the tray, the fingers flexibly and pivotably retract, and after the first set of two fingers clears the edge of the tray, said two fingers pivot up to their resting positions; and wherein after the two fingers return to their resting positions, the four finger pusher reverses direction, engages its first two fingers with the tray, thereby moving the tray from the egg staging area to the apparatus exit.

3. The apparatus of claim 2, wherein the energy is visible light and the detection means is a camera.
4. The apparatus of claim 2, wherein the energy is sound waves and the detection means is a sound sensor.
5. The apparatus of claim 2, wherein the energy is infrared light and the detection means is a camera capable of detecting infrared light.
6. The apparatus of claim 2, wherein the energy is electromagnetic radiation and the detection means is a sensor capable of detecting the electromagnetic radiation.
7. A method for candling, removing and relocating eggs using the apparatus of claim 1 or 2, comprising the steps of:
 - a. selecting an egg status that qualifies an egg for removal and relocation;
 - b. loading a tray containing a plurality of eggs to be candled into the apparatus;
 - c. moving the tray into the egg candling area;
 - d. directing candling energy at the eggs;
 - e. detecting energy that passes through the eggs;
 - f. processing the detected energy into a status signal;
 - g. moving the robot's flexible cup into contact with each egg having the selected status;

- h. applying subatmospheric pressure such that the flexible cup and the selected egg become reversibly coupled to one another;
 - i. moving the egg to a relocation area;
 - j. restoring atmospheric pressure, to release the egg from the flexible cup;
 - k. repeating the process of picking up and relocating eggs until all eggs with the selected status have been relocated; and
 - l. moving the egg tray, now lacking the eggs having the selected status, to the egg staging area.
8. The method of claim 4, wherein the movement of the tray from the egg candling area to the egg staging area is accomplished by pneumatic actuators, which are configured to grip and release the tray in response to appropriate pneumatic and/or electrical signals, and which are operably connected to a pneumatic cylinder, which is configured to move the actuators laterally, between the candling area and the egg staging area.
9. The method of claim 5, wherein once the tray has been moved by the cylinder into the egg staging area, a four finger pusher slide beneath the tray and engages with the tray to move the tray laterally, toward the apparatus exit.
10. The method of claim 6, further comprising the step of handing the tray off to a downstream *in ovo* injection machine, which is reversibly tethered to the egg candling and relocation apparatus.
11. The method of claims 6, wherein when the four finger pusher slides beneath the tray, the finger flexibly and pivotably retract, and after the first set of two fingers clears the edge of the tray, said two fingers pivot up to their resting positions.
12. The method of claim 8, wherein after the two fingers return to their resting positions, the four finger pusher reverses direction, engages its first two fingers with the tray, and thereby moves the tray from the egg staging area to the apparatus exit.

13. The method of claim 9, wherein once the four finger pusher reaches its distal most range of motion with respect to the anterior end of the apparatus, the pusher reverses direction and moves until its second set of two fingers clear the tray.
14. The method of claim 10, wherein once the second two fingers clear the tray, the pusher reverses direction, engages its second set of finger with the tray, and moves the tray through the apparatus exit.
15. The method of claim 11, further comprising the step of handing the tray off to a downstream *in ovo* injection apparatus.