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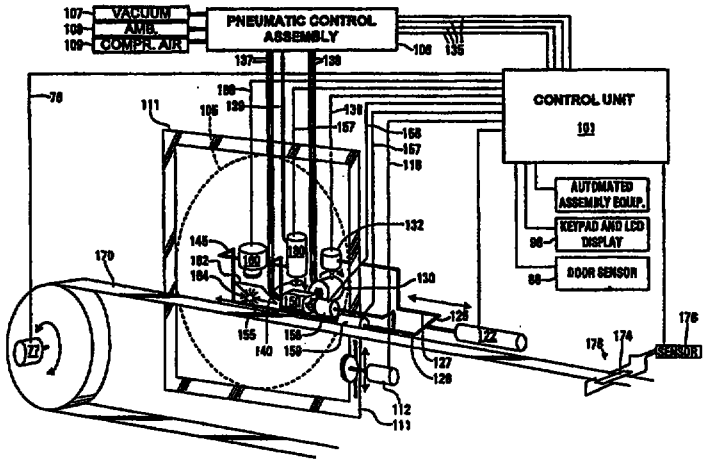
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(54) Title: METHOD AND APPARATUS FOR REMOVING DIE FROM A WAFER AND CONVEYING DIE TO A PICKUP LOCATION



(57) Abstract

A direct die feeder piks known good die from a wafer and placed them on a conveyor belt, which conveys the die to a pickup location. Frame (111) supports a wafer (105) which is a wafer that is sawed while adhered onto a flexible film, which is then stretched and mounted in a ring (110). A fork member (125), on which a pick head (150) is mounted slides along a horizontal axis and frame (111) slides along a vertical axis to allow the pick head (150) to access any die from the wafer. A camera (160) is directed downward at a 45° mirror (162) adjacent to the pick head to capture images of the wafer and determine the precise locations of die and qualify them. The pick head (150) can pick die from the wafer and place them directly on the conveyor belt (170) in the conventional orientation, or pass the die to a flip head (140) which then shifts to the left and lowers the die down past the pick head, placing the die on the conveyor belt in the flipped orientation. The conveyor belt operates until a die is detected at a pickup location (173) at one end of the conveyor except during placing operations of the pick head or flip head or during burst mode operations, during which the conveyor belt is loaded with closely spaced die, then fed in rapid succession to a multi-head host pick and place machine.