

CLAIMS:

1. A bond head for bonding a wire to a bonding surface, comprising:  
a bond head body movably retained by a mounting portion about a pivot  
5 having a pivot axis;  
a first actuator; and  
a second actuator,  
wherein said bond head body has  
a tool portion configured to receive a bonding tool for receiving and  
10 bonding said wire and  
an actuator portion coupled with said first actuator and said second  
actuator, said first actuator and said second actuator being operative to act  
on said actuator portion for driving said bond head body to rotate about the  
pivot with respect to said mounting portion to move said bonding tool in  
15 reciprocating directions towards and away from said bonding surface and  
to generate a bonding force during wire bonding, the first and second  
actuators being spaced from each other in a direction that is parallel to an  
axial direction of the pivot axis.
- 20 2. The bond head of claim 1, wherein said first actuator is operative to generate a  
first force on said actuator portion and said second actuator is operative to generate a  
second force on said actuator portion.
3. The bond head of claim 2, wherein said actuator portion is configured to receive  
25 said first force and said second force and be urged in a direction due to a resultant force  
comprising a combination of said first force and said second force.
4. The bond head of claim 2 or claim 3, wherein said first actuator and said second  
actuator are operative to generate said first force and said second force with one of equal  
30 and unequal magnitudes.
5. The bond head of any one of claims 2 to 4, wherein said first actuator and said  
second actuator are operative to generate said first force and said second force to act in  
one of a common and differing directions.

6. The bond head of any one of claims 2 to 5, wherein at least one of said first actuator and said second actuator are operative to generate at least one of said first force and said second force with at least one of a time-varying magnitude and direction.

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7. The bond head of any one of claims 3 to 6, wherein said actuation portion is configured to combine said first force and said second force to generate said resultant force having at least one of a time-varying magnitude and direction.

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8. The bond head of any one of claims 2 to 7, wherein said first actuator and said second actuator are operative to generate said first force and said second force having equal magnitudes and acting in opposing directions to combine to produce a null resultant force.

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9. The bond head of any one of the preceding claims, wherein said first actuator and said second actuator each comprises a motor.

10. The bond head of any one of the preceding claims, wherein said first actuator and said second actuator are collocated by said actuator portion.

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11. The bond head of any one of the preceding claims, wherein said first actuator is spaced apart from but connected to said second actuator by said actuator portion.

12. The bond head of any one of the preceding claims, wherein said first actuator and said second actuator are both located for concurrent movement with said actuator portion.

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13. The bond head of any one of the preceding claims, wherein said actuator portion has a first housing portion which receives a first moveable component of said first actuator and a second housing portion which receives a second moveable component of said second actuator.

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14. The bond head of claim 13, wherein said first moveable component of said first actuator is located in a fixed relationship with respect to said second moveable component of said second actuator by said actuator portion.

15. The bond head of claim 13 or claim 14, wherein said actuator portion comprises at least one brace extended between said first housing portion and said second housing portion.

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16. The bond head of any one of the preceding claims, wherein a first fixed component of said first actuator is located in a fixed relationship with respect to a second fixed component of said second actuator.

10 17. The bond head of claim 16, wherein said first fixed component and said second fixed component are located in a fixed relationship with respect to said mounting portion.

18. The bond head of any one of claims 13 to 17, wherein said first moveable component of said first actuator comprises a first coil and said second moveable  
15 component of said second actuator comprises a second coil.

19. The bond head of any one of claims 16 to 18, wherein said first fixed component of said first actuator and said second fixed component of said second actuator each comprise a magnet array.

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20. A method of moving a bond head for bonding a wire to a bonding surface, the method comprising the steps of:

movably retaining a bond head body on a mounting portion about a pivot having a pivot axis, said bond head body having an actuator portion and a tool portion configured  
25 to receive a bonding tool for receiving and bonding said wire;

coupling a first actuator and a second actuator with said actuator portion; and  
actuating said first actuator and said second actuator to drive said bond head body to rotate about the pivot with respect to said mounting portion to move said bonding tool in reciprocating directions towards and away from said bonding surface and to generate  
30 a bonding force during wire bonding, the first and second actuators being spaced from each other in a direction that is parallel to an axial direction of the pivot axis.