What is claimed is:

1. A multi-coil choke comprising:

a magnetic core having a first leg, a second leg and a third leg, said legs being substantially parallel to each other;

a first coil wrapped around said first leg and terminating in a first lead at a first end thereof and a second lead at a second end thereof;

a second coil wrapped around said second leg and terminating in a first lead at a first end thereof and a second lead at a second end thereof;

a third coil wrapped around said third leg and terminating in a first lead at a first end thereof and a second lead at a second end thereof;

a fourth coil formed from a proximal portion of the second lead of said first coil, said fourth coil being wrapped around a distal portion of the second lead of said third coil; and

a fifth coil formed from a proximal portion of the second lead of said third coil, said fifth coil being wrapped around a distal portion of the second lead of said first coil.

2. A multi-coil choke in accordance with claim 1 wherein:

the distal portion of the second lead of said of said first coil passes through said third coil before passing through said fifth coil; and

the distal portion of the second lead of said third coil passes through said first coil before passing through said fourth coil.

3. A multi-coil choke in accordance with claim 1 wherein said magnetic core is formed from two rectangular closed cores placed side-by-side with adjacent sides forming said second leg.

4. A multi-coil choke in accordance with claim 3 wherein:

said first leg includes a gap;

said second leg includes substantially aligned gaps in the adjacent sides of said rectangular closed cores; and

said third leg includes a gap.

5. A multi-coil choke in accordance with claim 4 comprising an additional gap along the length of the adjacent sides of said rectangular closed cores.

6. A multi-coil choke in accordance with claim 4 wherein said gaps are centrally located along their respective legs.

7. A multi-coil choke in accordance with claim 3 wherein each of said rectangular closed cores is contained within an insulating cover.

8. A multi-coil choke in accordance with claim 1 wherein said first coil is wrapped in one of a clockwise and counterclockwise direction, and said second and third coils are wrapped in the other of said clockwise and counterclockwise direction.

9. A multi-coil choke in accordance with claim 8 wherein said fourth coil is wrapped in the same direction as said first coil and said fifth coil is wrapped in the same direction as said third coil.

10. A multi-coil choke in accordance with claim 1 wherein said first and fourth coils are wrapped in a counterclockwise direction, and said second, third and fifth coils are wrapped in a clockwise direction.

11. A power conditioner for AC power lines comprising:

a multi-coil choke;

at least one capacitor; and

means for coupling said choke and at least one capacitor in series across an AC power source;

wherein said choke comprises:

a magnetic core having a first leg, a second leg and a third leg, said legs being substantially parallel to each other;

a first coil wrapped around said first leg and terminating in a first lead at a first end thereof and a second lead at a second end thereof;

a second coil wrapped around said second leg and terminating in a first lead at a first end thereof and a second lead at a second end thereof;

a third coil wrapped around said third leg and terminating in a first lead at a first end thereof and a second lead at a second end thereof;

a fourth coil formed from a proximal portion of the second lead of said first coil, said fourth coil being wrapped around a distal portion of the second lead of said third coil; and

a fifth coil formed from a proximal portion of the second lead of said third coil, said fifth coil being wrapped around a distal portion of the second lead of said first coil.

12. A power conditioner in accordance with claim 11 wherein:

the distal portion of the second lead of said of said first coil passes through said third coil before passing through said fifth coil; and

the distal portion of the second lead of said third coil passes through said first coil before passing through said fourth coil.

13. A power conditioner in accordance with claim 11 comprising a plurality of said multi-coil chokes, each coupled in series with at least one capacitor across a respective AC power source.

14. A power conditioner in accordance with claim 13 wherein said means for coupling are adapted to couple each of said multi-coil chokes with:

said first and fourth coils in series with at least one capacitor across a respective AC power source;

said second coil in series with at least one capacitor across a respective AC power source; and

said third and fifth coils in series with at least one capacitor across a respective AC power source.

15. A power conditioner in accordance with claim 11, wherein said means for coupling are adapted to couple:

said first and fourth coils in series with at least one capacitor across a respective AC power source;

said second coil in series with at least one capacitor across a respective AC power source; and

said third and fifth coils in series with at least one capacitor across a respective AC power source.

16. A power conditioner in accordance with claim 11 wherein said magnetic core is formed from two rectangular closed cores placed side-by-side with adjacent sides forming said second leg.

17. A power conditioner in accordance with claim 16 wherein:

said first leg includes a gap;

said second leg includes substantially aligned gaps in the adjacent sides of said rectangular closed cores; and

said third leg includes a gap.

18. A power conditioner in accordance with claim 17 comprising an additional gap along the length of the adjacent sides of said rectangular closed cores.

19. A power conditioner in accordance with claim 17 wherein said gaps are centrally located along their respective legs.

20. A power conditioner in accordance with claim 16 wherein each of said rectangular closed cores is contained within an insulating cover.

SUMMARY OF THE INVENTION

[0009] In accordance with the invention, a multi-coil choke is provided. The choke includes a magnetic core having a first leg, a second leg and a third leg. The three legs are substantially parallel to each other. A first coil is wrapped around the first leg. The first coil terminates in a first lead at a first end thereof and a second lead at a second end thereof. A second coil is wrapped around the second leg of the core and terminates in a first lead at a first end thereof and a second lead at a second end thereof. A third coil is wrapped around the third leg and terminates in a first lead at a first end thereof and a second lead at a second end thereof. A fourth coil is formed from a proximal portion of the second lead of the first coil. The fourth coil is wrapped around a distal portion of the second lead of the third coil. A fifth coil is formed from a proximal portion of the second lead of the third coil. The fifth coil is wrapped around a distal portion of the second lead of the first coil.

[0010] In a preferred embodiment, the distal portion of the second lead ~~of said~~ of said first coil passes through said third coil before passing through said fifth coil. Likewise, the distal portion of the second lead of said third coil passes through said first coil before passing through said fourth coil.

[0011] The magnetic core can be formed from two rectangular closed cores placed side-by-side with adjacent sides forming the second leg. The first and third legs can each include a gap. The second leg can include substantially aligned gaps in the adjacent sides of the rectangular closed cores. The gaps can be centrally located along their respective legs. An additional gap can be provided along the length of the adjacent sides of the rectangular closed cores. Moreover, each of the rectangular closed cores can be contained within an insulating cover.

[0012] A multi-coil choke in accordance with a preferred embodiment of the invention has its first coil wrapped in one of a clockwise and counterclockwise direction, with the second and third coils being wrapped in the other of the clockwise and

Claims

1. A multi-coil choke, comprising:

a magnetic core having a first leg, a second leg and a third leg, said legs being substantially parallel to each other;

a first coil wrapped around said first leg and terminating in a first lead at a first end thereof and a second lead at a second end thereof;

a second coil wrapped around said second leg and terminating in a first lead at a first end thereof and a second lead at a second end thereof;

a third coil wrapped around said third leg and terminating in a first lead at a first end thereof and a second lead at a second end thereof;

a fourth coil formed from a proximal portion of the second lead of said first coil, said fourth coil being wrapped around a distal portion of the second lead of said third coil but not being wrapped around the core;

a fifth coil formed from a proximal portion of the second lead of said third coil, said fifth coil being wrapped around a distal portion of the second lead of said first coil but not being wrapped around the core;

the distal portion of the second lead of said first coil passes through said third coil before passing through said fifth coil;

the distal portion of the second lead of said third coil passes through said first coil before passing through said fourth coil; and

said first coil is wrapped in one of a clockwise and counterclockwise direction, and said second and third coils are wrapped in the other of said clockwise and counterclockwise direction.

2. A multi-coil choke in accordance with claim 1 wherein said magnetic core is formed from two rectangular closed cores placed side-by-side with adjacent sides forming said second leg.

3. A multi-coil choke in accordance with claim 2 wherein:

said first leg includes a gap;

said second leg includes substantially aligned gaps in the adjacent sides of said rectangular closed cores; and

said third leg includes a gap.

4. A multi-coil choke in accordance with claim 3 comprising an additional gap along the length of the adjacent sides of said rectangular closed cores.

5. A multi-coil choke in accordance with claim 3 wherein said gaps are centrally located along their respective legs.

6. A multi-coil choke in accordance with claim 2 wherein each of said rectangular closed cores is contained within an insulating cover.

7. A multi-coil choke in accordance with claim 1 wherein said fourth coil is wrapped in the same direction as said first coil and said fifth coil is wrapped in the same direction as said third coil.

8. A multi-coil choke in accordance with claim 1 wherein said first and fourth coils are wrapped in a counterclockwise direction, and said second, third and fifth coils are wrapped in a clockwise direction.

9. A power conditioner for AC power lines, comprising:

a multi-coil choke;

at least one capacitor; and

means for coupling said choke and at least one capacitor in series across an AC power source;

wherein said choke comprises:

a magnetic core having a first leg, a second leg and a third leg, said legs being

substantially parallel to each other;

a first coil wrapped around said first leg and terminating in a first lead at a first end thereof and a second lead at a second end thereof;

a second coil wrapped around said second leg and terminating in a first lead at a first end thereof and a second lead at a second end thereof;

a third coil wrapped around said third leg and terminating in a first lead at a first end thereof and a second lead at a second end thereof;

a fourth coil formed from a proximal portion of the second lead of said first coil, said fourth coil being wrapped around a distal portion of the second lead of said third coil but not being wrapped around the core;

a fifth coil formed from a proximal portion of the second lead of said third coil, said fifth coil being wrapped around a distal portion of the second lead of said first coil but not being wrapped around the core;

the distal portion of the second lead of said first coil passes through said third coil before passing through said fifth coil;

the distal portion of the second lead of said third coil passes through said first coil before passing through said fourth coil; and

said first coil is wrapped in one of a clockwise and counterclockwise direction, and said second and third coils are wrapped in the other of said clockwise and counterclockwise direction.

10. A power conditioner in accordance with claim 9 comprising a plurality of said multi-coil chokes, each coupled in series with at least one capacitor across a respective AC power source.

11. A power conditioner in accordance with claim 10 wherein said means for coupling are adapted to couple each of said multi-coil chokes with:

said first and fourth coils in series with at least one capacitor across a respective AC power source;

said second coil in series with at least one capacitor across a respective AC power source; and

said third and fifth coils in series with at least one capacitor across a respective AC power source.

12. A power conditioner in accordance with claim 9, wherein said means for coupling are adapted to couple:

said first and fourth coils in series with at least one capacitor across a respective AC power source;

said second coil in series with at least one capacitor across a respective AC power source; and

said third and fifth coils in series with at least one capacitor across a respective AC power source.

13. A power conditioner in accordance with claim 9 wherein said magnetic core is formed from two rectangular closed cores placed side-by-side with adjacent sides forming said second leg.

14. A power conditioner in accordance with claim 13 wherein:

said first leg includes a gap;

said second leg includes substantially aligned gaps in the adjacent sides of said rectangular closed cores; and

said third leg includes a gap.

15. A power conditioner in accordance with claim 14 comprising an additional gap along the length of the adjacent sides of said rectangular closed cores.

16. A power conditioner in accordance with claim 14 wherein said gaps are centrally located along their respective legs.

17. A power conditioner in accordance with claim 13 wherein each of said rectangular closed cores is contained within an insulating cover.