What is claimed is:

[Claim 1] Electromagnetic propulsion devices comprising:

a barrel; and

a narrow cavity therein which extends the length of said barrel and having:

a uniform right section profile its length and

a breach end opening at one barrel end and

a muzzle end opening at the other barrel end and

a central axis which extends from said breach end opening to said muzzle end opening; and

two barrel rails which are:

power rails, and

parallel to said cavity axis and

located across the cavity from each other, and

located at, in, or proximal the narrow end walls of the barrel cavity and

each said power rails has:

continuous barrel cavity surface along its length and

power connection means at its breach end to outside the device

for attachment to an outside power source, and

said power rails divide the barrel cavity walls into two barrel cavity wall segments with boundaries of:

the breach end boundary of the cavity, and

the muzzle end boundary of the cavity, and

the cavity surfaces of the two power rails and

ray extension therefrom to said breach and muzzle end boundaries; and

a wall conductor assembly located in each said barrel cavity wall segment and

each wall conductor assembly is comprised of:

a barrel bus which is:

in the barrel cavity wall segment with said assembly and

adjacent, parallel and in close proximity one of the power rails and

proximal the barrel bus of the wall conductor assembly in the second barrel cavity wall segment, and

electrically isolated from said power rail and said second barrel bus and

similar in length as said power rail and said second barrel bus and

at similar location along the length of the barrel cavity as said power rail and second assembly's barrel bus, and

an array of wall conductors which are:

in the barrel cavity wall segment with said assembly and

proximal or at the barrel cavity surface of said segment and

parallel to each other, and

spaced from each other, and

orthogonal the barrel cavity axis, and

each wall conductor of said array:

has at one end, electrical continuity with the barrel bus and

extends from proximity the barrel bus to proximity the narrow cavity wall distal the barrel bus and the barrel rail thereat, and

contact means for each wall conductor of said array that:

is located proximal the barrel bus distal end of the wall conductor and

has electrical continuity with said wall conductor and

has surface in the barrel cavity; and

armatures for propulsion through said barrel cavity having:

a central axis that is, with the armature in the barrel cavity, coincident the central axis of said cavity or very close to and parallel the cavity central axis, and

a muzzle end that is, with the armature in the barrel cavity, the armature end closest the cavity's muzzle end, and

a breach end that is, with the armature in the barrel cavity, the armature end closest the cavity's breach end, and

profiles in all right sections to said armature axis smaller then the barrel cavity right section profile, and

a propulsion bus that is:

oriented orthogonal the armature axis, and

located midway between the armature's muzzle and breach ends and

that, with the armature in the barrel cavity,

extends across the cavity between the cavity's narrow end walls and

has surface at one end that has continuous electrical continuity with the cavity surface of the barrel bus proximal power rail and

has continuous electrical continuity at its other end with propulsion bus-aft shunt circuit means; and

a first forward current shunt that:

is located between the propulsion bus and the muzzle end of the armature and,

with the armature in the barrel cavity,

is proximal the barrel bus distal power rail, and

has surface with continuous electrical continuity with cavity surface of the barrel bus distal power rail and

has surface at contact means of the first wall conductor assembly and,

via said contact means, has continuous electrical continuity with forward wall conductor of said assembly; and

a first aft current shunt that:

is located between the propulsion bus and breach end of the armature and, with the armature in the barrel cavity,

is proximal the barrel bus distal power rail, and

has surface at contact means of the first wall conductor assembly and,

via said contact means, has continuous electrical continuity with aft wall conductor of said assembly and

has continuous electrical continuity with aft shunt-forward shunt circuit means; and

a second forward current shunt that:

is located between the propulsion bus and the muzzle end of the armature and,

with the armature in the barrel cavity,

is proximal the barrel bus distal power rail, and

has surface at contact means of the second wall conductor assembly and,

via said contact means, has continuous electrical continuity with forward wall conductor of said assembly, and

has continuous electrical continuity with said aft shunt-forward shunt circuit means; and

a second aft current shunt that:

is located between the propulsion bus and breach end of the armature and, with the armature in the barrel cavity,

is proximal the barrel bus distal power rail, and

has surface at contact means of the second wall conductor assembly and,

via said contact means, has continuous electrical continuity with aft wall conductor of said assembly and

has continuous electrical continuity with propulsion bus-aft shunt circuit means; and

propulsion bus-aft shunt circuit means comprised of:

the third barrel rail that is:

in, at, or proximal the barrel bus distal narrow end wall of said cavity and electrically isolated from all other barrel rail thereat, and

proximal the power rail thereat and

parallel said power rail and

of length similar said power rail's length, and

at similar location along the barrel cavity length as said power rail, and

said third barrel rail has continuous barrel cavity surface along its length and

surface at the end of said propulsion bus that:

is proximal the current shunts, and

that has, with the armature in the barrel cavity,

continuous electrical continuity with the barrel cavity surface of said third barrel rail, and

surface on the second aft current shunt that has,

with the armature in the barrel cavity,

continuous electrical continuity the barrel cavity surface of said third barrel rail; and

aft shunt-forward shunt circuit means comprised of:

the fourth barrel rail that is:

in, at, or proximal the barrel bus distal narrow end wall of said cavity and

electrically isolated from all other barrel rail thereat and

proximal the power rail thereat and

parallel said power rail and

of length similar said power rail's length, and

at similar location along the barrel cavity length as said power rail, and

said fourth barrel rail has continuous barrel cavity surface along its length; and

surface on the first aft current shunt that has,

with the armature in the barrel cavity,

continuous electrical continuity with the barrel cavity surface of said fourth barrel rail; and

surface on the second forward current shunt that,

with the armature in the barrel cavity,

has continuous electrical continuity the barrel cavity surface of said fourth barrel rail.

[Claim 2] Electromagnetic propulsion devices as claimed in claim 1 wherein an armature is retained in the breach end of the barrel cavity for release and propulsion in the barrel cavity towards the barrel muzzle on application of sufficient power to the power rails.

[Claim 3] Electromagnetic propulsion devices as claimed in claim 2 wherein the armature is retained at the cavity breach by a fuse pin which:

at one end is retained at one power rail and has electrical continuity therewith, and

at its other end is retained in the second power rail and has electrical continuity therewith, and

extends through an armature channel there between and,

with power supplied to the power rails, provides a short circuit between said rails until vaporized and thereby freeing the armature for traverse of the barrel cavity.

[Claim 4] Electromagnetic propulsion devices as claimed in claim 1 but wherein the propulsion bus-aft shunt circuit means is comprised of:

an electric current bus in the armature that is located proximal the current shunts therein and is between and connects the armature's second aft current shunt and the armature's propulsion bus.

[Claim 5] Electromagnetic propulsion devices as claimed in claim 1 but wherein the aft shunt-forward shunt circuit means is comprised of:

an electric current bus in the armature that is located proximal the current shunts therein and is between and connects the armature's first aft current shunt and the armature's second forward current shunt.

[Claim 6] Electromagnetic propulsion devices as claimed in claim 1 but wherein:

the propulsion bus-aft shunt circuit means is comprised of:

an electric current bus in the armature that is located proximal the current shunts therein and is between and connects the armature's second aft current shunt and the propulsion bus; and

the aft shunt-forward shunt circuit means is comprised of:

an electric current bus in the armature that is located proximal the current shunts therein and is between and connects the armature's first aft current shunt and the armature's second forward current shunt.

[Claim 7] Electromagnetic propulsion devices as claimed in claim 1 but wherein said barrel and barrel cavity has a twist so that:

area elements in right sections to the barrel, when taken at incremental increasing distance from a barrel reference point, have like shape, area, and angle relative to

each other at fixed radii about a barrel cavity axis at incremental increasing angular displacement about said axis from an axial reference plane and the angular displacement per unite axial distance is constant; and

said armatures for use in said barrel cavity have

therein an axis coincident said barrel cavity axis and a like twist so that area elements in right sections to said armature, when taken at incremental increasing distance from an armature reference point, have like shape, area, and angle relative to each other at fixed radii about said armature axis at incremental increasing angular displacement about said axis from an axial reference plane and the angular displacement per unite axial distance is constant and identical to said barrel and barrel cavity constant.

[Claim 8] Electromagnetic propulsion devices comprising:

a barrel; and

a narrow cavity therein which extends the length of said barrel having:

a uniform right section profile its length and

a breach end opening at one barrel end and

a muzzle end opening at the other barrel end and

a central axis which extends from said breach end opening to said muzzle end opening; and

two barrel rails which are:

power rails, and

parallel to said cavity central axis and

located across the cavity from each other and

located at, in, or proximal the narrow end walls of the barrel cavity and

each said power rail has:

continuous barrel cavity surface along its length and

power connection means at its breach end to outside the device for

attachment to an outside power source and

said barrel rails divide the barrel cavity walls into two barrel cavity wall segments with boundaries of:

the breach end boundary of the cavity, and

the muzzle end boundary of the cavity, and

the cavity surfaces of the two power rails and

ray extensions therefrom to said breach and muzzle end boundaries; and

a wall conductor assembly located in each said barrel cavity wall segment and

each said wall conductor assembly has:

a barrel bus that is:

in the barrel cavity wall segment with said assembly and

adjacent, parallel, and in close proximity one of the power rails, and

proximal, and parallel the barrel bus of the wall conductor assembly in the second barrel cavity wall segment, and

electrically isolated from said power rail and said second barrel bus, and

of length similar to the lengths of said power rail and said barrel bus and

at similar location along the length of the barrel as said power rail, and

said second assembly's barrel bus, and

an array of wall conductors that are:

in said barrel cavity wall segment with said assembly and

proximal or at said barrel cavity wall segment's barrel cavity surface and

parallel to each other, and spaced from each other,

and orthogonal the barrel cavity axis, and

each wall conductor of said array

has at one end electrical continuity with the barrel bus and

extends from proximity the barrel bus to proximity the narrow cavity wall distal the barrel bus and the barrel rail thereat, and

contact means for each wall conductor of said array that:

is located proximal the barrel bus distal end of its wall conductor and

has electrical continuity with said wall conductor and

has surface coincident the barrel cavity surface and /or in the barrel cavity; and

armatures for propulsion from the breach end to muzzle end of said barrel cavity having:

a muzzle end that is, with the armature is in the barrel cavity, closest the barrel cavity's muzzle end, and

a breach end that is, with the armature is in the barrel cavity, closest the barrel cavity's breach end, and

a central axis that is, with the armature in the barrel cavity,

coincident or very close to and parallel the barrel cavity central axis, and

all right section profiles to said armature axis smaller then the barrel cavity right section profile, and

a propulsion bus that:

is oriented orthogonal the armature's central axis, and

is located midway between the armature's muzzle and breach ends, and

that, with the armature in the barrel cavity,

extends across the barrel cavity between said cavity's narrow end walls, and

has at one end surface with continuous electrical continuity with the cavity surface of the power rail proximal the barrel buses, and

has at its other end continuous electrical continuity with propulsion bus-aft shunt circuit means, and

maintains continuous electrical continuity between the barrel bus proximal power rail and propulsion bus-aft shunt circuit means, and,

with the armature in the barrel cavity and power supplied to the power rails,

maintains a continuous current path between the propulsion bus-aft shunt circuit means and the barrel bus proximal power rail in:

a direction orthogonal to:

the barrel cavity, and the barrel cavity axis, and

the armature axis and the direction of barrel cavity traverse by the armature, and in

a direction parallel to the wall conductors of the wall conductor assembles; and

a first forward current shunt that:

is located between the armature's propulsion bus and the armature's muzzle end, and

that, with the armature in the barrel cavity,

is proximal the barrel bus distal power rail, and

has surface with continuous electrical continuity with cavity surface of the barrel bus distal power rail, and

has surface that is at contact means of the first wall conductor assembly and, via said contact means, has continuous electrical continuity with forward wall conductor of said wall conductor assembly, and

with the armature in the barrel cavity,

maintains continuous electrical continuity between forward wall conductor of the first wall conductor assembly and the barrel bus distal power rail and

with the armature in the barrel cavity and power supplied to the power rails, maintains a current path between the barrel bus distal power rail and forward wall conductor of the first wall conductor assembly; and

a first aft current shunt that:

is located between the armature's propulsion bus and the armature's breach end, and

that, with the armature in the barrel cavity,

is proximal the barrel bus distal power rail, and

has surface that is at contact means of the first wall conductor assembly and, via said contact means, has continuous electrical continuity with aft wall conductor of said wall conductor assembly, and

has continuous electrical continuity with aft shunt-forward shunt circuit means, and

with the armature in the barrel cavity maintains continuous electrical continuity between aft wall conductor of the first wall conductor assembly and the aft shunt-forward shunt circuit means, and

with the armature in the barrel cavity and power supplied to the power rails, maintains a current path between the aft wall conductor of the first wall conductor assembly and the aft shunt-forward shunt circuit means; and

a second forward current shunt that:

is located between the propulsion bus and the muzzle end of the armature and

with the armature in the barrel cavity,

is proximal the barrel bus distal power rail, and

has surface at contact means of the second wall conductor assembly and via said contact means, has continuous electrical continuity with forward wall conductor of said assembly, and

has continuous electrical continuity with said aft shunt-forward shunt circuit means and

with the armature in the barrel cavity,

maintains continuous electrical continuity between forward wall conductor of the second wall conductor assembly and said aft shunt-forward shunt circuit means, and

with the armature in the barrel cavity and power supplied to the power rails,

maintains a continuous current path between forward wall conductor of the second wall conductor assembly and the aft shunt-forward shunt circuit means, and

a second aft current shunt that:

is located between the propulsion bus and breach end of the armature and that, with the armature in the barrel cavity,

is proximal the barrel bus distal power rail, and

has surface at the contact means of the second wall conductor assembly and, via said contact means, has continuous electrical continuity with aft wall conductor of said assembly, and

has continuous electrical continuity with propulsion bus-aft shunt circuit means, and

that, with the armature in the barrel cavity,

maintains continuous electrical continuity between aft wall conductor of the second wall conductor assembly and said propulsion bus-aft shunt circuit means, and

with the armature in the barrel cavity and power supplied to the power rails, maintains a continuous current path between aft wall conductor of the second wall conductor assembly and the propulsion bus-aft shunt circuit means, and

propulsion bus-aft shunt circuit means comprised of:

the third barrel rail that is:

in, at, or proximal the barrel bus distal narrow end wall of said cavity and electrically isolated from all other barrel rail thereat, and

proximal the power rail thereat and

parallel said power rail and

of length similar said power rail's length, and

at similar location along the barrel cavity length as said power rail, and

said third rail has continuous barrel cavity surface along its length and

surface at the end of said propulsion bus that:

is proximal the current shunts, and

that has, with the armature in the barrel cavity,

continuous electrical continuity with the barrel cavity surface of said third barrel rail, and

surface on the second aft current shunt that has,

with the armature in the barrel cavity,

continuous electrical continuity the barrel cavity surface of said third barrel rail, and

with the armature in the barrel cavity,

the propulsion bus-aft shunt circuit means maintains continuous electrical continuity between aft wall conductor of the second wall conductor assembly and the propulsion bus, and

with the armature in the barrel cavity and power supplied to the power rails

the propulsion bus-aft shunt circuit means maintains a continuous current path between aft wall conductor of the second wall conductor assembly and the propulsion bus; and

aft shunt-forward shunt circuit means comprised of:

the fourth barrel rail that is:

in, at, or proximal the barrel bus distal narrow end wall of said cavity and electrically isolated from all other barrel rail thereat and

proximal the power rail thereat and

parallel said power rail and

of length similar said power rail's length, and

at similar location along the barrel cavity length as said power rail, and

said fourth rail has continuous barrel cavity surface along its length; and

surface on the first aft current shunt that has,

with the armature in the barrel cavity,

continuous electrical continuity with the barrel cavity surface of said fourth barrel rail; and

surface on the second forward current shunt that,

with the armature in the barrel cavity,

has continuous electrical continuity the barrel cavity surface of said fourth barrel rail and

with the armature in the barrel cavity,

the aft shunt-forward shunt circuit means maintains continuous electrical continuity between aft wall conductor of the first wall conductor assembly and forward wall conductor of the second wall conductor assembly, and

with the armature in the barrel cavity and power supplied to the power rails,

the aft shunt-forward shunt circuit means maintains a continuous current path between aft wall conductor of the first wall conductor assembly and forward wall conductor of the second wall conductor assembly.

[Claim 9] Electromagnetic propulsion devices as claimed in claim 8 wherein an armature is retained in the breach end of the barrel cavity for release and propulsion in the barrel cavity towards the barrel muzzle on application of sufficient power to the power rails.

[Claim 10] Electromagnetic propulsion devices as claimed in claim 9 wherein the armature is retained at the cavity breach by a fuse pin which:

at one end is retained at one power rail and has electrical continuity therewith, and

at its other end is retained in the second power rail and has electrical continuity therewith, and

extends through an armature channel there between and,

with power supplied the power rails, provides a short circuit between said rails until vaporized and thereby freeing the armature for traverse of the barrel cavity.

[Claim 11] Electromagnetic propulsion devices as claimed in claim 8 but wherein

the propulsion bus-aft shunt circuit means is comprised of:

an electric current bus in the armature that is located proximal the current shunts therein and is between and connects the armature's second aft current shunt and the armature's propulsion bus.

[Claim 12] Electromagnetic propulsion devices as claimed in claim 8 but wherein

the aft shunt-forward shunt circuit means is comprised of:

an electric current bus in the armature that is located proximal the current shunts therein and is between and connects the armature's first aft current shunt and the armature's second forward current shunt.

[Claim 13] Electromagnetic propulsion devices as claimed in claim 8 but wherein:

the propulsion bus-aft shunt circuit means is comprised of:

an electric current bus in the armature that is located proximal the current shunts therein and is between and connects the armature's second aft current shunt and the propulsion bus; and

the aft shunt-forward shunt circuit means is comprised of:

an electric current bus in the armature that is located proximal the current shunts therein and is between and connects the armature's first aft current shunt and the armature's second forward current shunt.

[Claim 14] Electromagnetic propulsion devices as claimed in claim 8 but wherein said barrel and barrel cavity has a twist so that:

area elements in right sections to the barrel, when taken at incremental increasing distance from a barrel reference point, have like shape, area, and angle relative to each other at fixed radii about a barrel cavity axis at incremental increasing angular displacement about said axis from an axial reference plane and the angular displacement per unite axial distance is constant; and

said armatures for use in said barrel's barrel cavity have

therein an axis coincident said barrel cavity axis and a like twist so that area elements in right sections to said armature, when taken at incremental increasing distance from an armature reference point, have like shape, area, and angle relative to each other at fixed radii about the said armature axis at incremental increasing angular

displacement about said axis from an axial reference plane and the angular displacement per unite axial distance is constant and identical to said barrel's and barrel cavity constant.

[Claim 15] Electromagnetic propulsion devices comprising:

a barrel; and

a narrow cavity therein which extends the length of said barrel having:

a uniform right section profile its length and

a breach end opening at one barrel end and

a muzzle end opening at the other barrel end and

a central axis which extends from said breach end opening to said muzzle end opening; and

two barrel rails which are:

power rails, and

parallel to said cavity central axis and

located across the cavity from each other and

located at, in, or proximal the narrow end walls of the barrel cavity and

each said power rail has:

continuous barrel cavity surface along its length and

power connection means at its breach end to outside the device for attachment to an outside power source and

said barrel rails divide the barrel cavity walls into two barrel cavity wall segments with boundaries of:

the breach end boundary of the cavity, and

the muzzle end boundary of the cavity, and

the cavity surfaces of the two power rails and

ray extensions therefrom to said breach and muzzle end boundaries; and

a wall conductor assembly located in each said barrel cavity wall segment and

each said wall conductor assembly has:

a barrel bus that is:

in the barrel cavity wall segment with said assembly and

adjacent, parallel, and in close proximity one of the power rails, and

proximal, and parallel the barrel bus of the wall conductor assembly in the second barrel cavity wall segment, and

electrically isolated from said power rail and said second barrel bus, and

of length similar to the lengths of said power rail and said barrel bus and

at similar location along the length of the barrel as said power rail, and

said second assembly's barrel bus, and

an array of wall conductors that are:

in said barrel cavity wall segment with said assembly and

proximal or at said barrel cavity wall segment's barrel cavity surface and

parallel to each other, and spaced from each other,

and orthogonal the barrel cavity axis, and

each wall conductor of said array

has at one end electrical continuity with the barrel bus and

extends from proximity the barrel bus to proximity the narrow cavity wall

distal the barrel bus and the barrel rail thereat, and

contact means for each wall conductor of said array that:

is located proximal the barrel bus distal end of its wall conductor and

has electrical continuity with said wall conductor and

has surface coincident the barrel cavity surface and /or in the barrel cavity; and

armatures for propulsion from the breach end to muzzle end of said barrel cavity having:

a muzzle end that is, with the armature is in the barrel cavity, closest the barrel cavity's muzzle end, and

a breach end that is, with the armature is in the barrel cavity, closest the barrel cavity's breach end, and

a central axis that is, with the armature in the barrel cavity,

coincident or very close to and parallel the barrel cavity central axis, and

all right section profiles to said armature axis smaller then the barrel cavity right section profile, and

a propulsion bus that:

is oriented orthogonal the armature's central axis, and

is located midway between the armature's muzzle and breach ends, and

that, with the armature in the barrel cavity,

extends across the barrel cavity between said cavity's narrow end walls, and

has at one end surface with continuous electrical continuity with the cavity surface of the barrel bus proximal power rail, and

has at its other end continuous electrical continuity with propulsion bus-aft shunt circuit means, and

maintains continuous electrical continuity between the barrel bus proximal power rail and propulsion bus-aft shunt circuit means, and,

with the armature in the barrel cavity and power supplied to the power rails,

maintains a continuous current path between the propulsion bus-aft shunt circuit means and the barrel bus proximal power rail in:

a direction orthogonal to:

the barrel cavity, and the barrel cavity axis, and

the armature axis and the direction of barrel cavity traverse by the armature, and in

a direction parallel to the wall conductors of the

wall conductor assembles; and

a first forward current shunt that:

is located between the armature's propulsion bus and the armature's

muzzle end, and

that, with the armature in the barrel cavity,

is proximal the barrel bus distal power rail, and

has surface with continuous electrical continuity with cavity surface of the

barrel bus distal power rail, and

has surface that is at contact means of the first wall conductor assembly and, via said contact means, has continuous electrical continuity with forward wall conductor of said wall conductor assembly, and

with the armature in the barrel cavity,

maintains continuous electrical continuity between forward wall conductor of the first wall conductor assembly and the barrel bus distal power rail and

with the armature in the barrel cavity and power supplied to the power rails,

maintains a current path between the barrel bus distal power rail and forward wall conductor of the first wall conductor assembly; and

a first aft current shunt that:

is located between the armature's propulsion bus and the armature's breach end, and

that, with the armature in the barrel cavity,

is proximal the barrel bus distal power rail, and

has surface that is at contact means of the first wall conductor assembly and, via said contact means, has continuous electrical continuity with aft wall conductor of said wall conductor assembly, and

has continuous electrical continuity with aft shunt-forward shunt circuit means, and

with the armature in the barrel cavity, maintains continuous electrical continuity between aft wall conductor of the first wall conductor assembly and the aft shunt-forward shunt circuit means, and

with the armature in the barrel cavity and power supplied to the power rails, maintains a current path between the aft wall conductor of the first wall conductor assembly and the aft shunt-forward shunt circuit means; and

a second forward current shunt that:

is located between the propulsion bus and the muzzle end of the armature and

with the armature in the barrel cavity,

is proximal the barrel bus distal power rail, and

has surface at contact means of the second wall conductor assembly and, via said contact means, has continuous electrical continuity with forward wall conductor of said assembly, and

has continuous electrical continuity with said aft shunt-forward shunt circuit means and

with the armature in the barrel cavity,

maintains continuous electrical continuity between forward wall conductor of the second wall conductor assembly and said aft shunt-forward shunt circuit means, and

with the armature in the barrel cavity and power supplied to the power rails,

maintains a continuous current path between forward wall conductor of the second wall conductor assembly and the aft shunt-forward shunt circuit means, and

a second aft current shunt that:

is located between the propulsion bus and breach end of the armature and that, with the armature in the barrel cavity,

is proximal the barrel bus distal power rail, and

has surface at the contact means of the second wall conductor assembly and, via said contact means, has continuous electrical continuity with aft wall conductor of said assembly, and

has continuous electrical continuity with propulsion bus-aft shunt circuit means, and

that, with the armature in the barrel cavity,

maintains continuous electrical continuity between aft wall conductor of the second wall conductor assembly and said propulsion bus-aft shunt circuit means, and

with the armature in the barrel cavity and power supplied to the power rails,

maintains a continuous current path between aft wall conductor of the second wall conductor assembly and the propulsion bus-aft shunt circuit means, and

propulsion bus-aft shunt circuit means comprised of:

the third barrel rail that is:

in, at, or proximal the barrel bus distal narrow end wall of said cavity and electrically isolated from all other barrel rail thereat, and

proximal the power rail thereat and

parallel said power rail and

of length similar said power rail's length, and

at similar location along the barrel cavity length as said power rail, and

said third rail has continuous barrel cavity surface along its length, and

surface at the end of said propulsion bus that:

is proximal the current shunts, and

that has, with the armature in the barrel cavity,

continuous electrical continuity with the barrel cavity surface of said third barrel rail, and

surface on the second aft current shunt that has,

with the armature in the barrel cavity,

continuous electrical continuity the barrel cavity surface of said third barrel rail, and

with the armature in the barrel cavity,

the propulsion bus-aft shunt means maintains continuous electrical continuity between aft wall conductor of the second wall conductor assembly and the propulsion bus, and

with the armature in the barrel cavity and power supplied to the power rails

the propulsion bus-aft shunt circuit means maintains a continuous current path between aft wall conductor of the second wall conductor assembly and the propulsion bus; and

aft shunt-forward shunt circuit means comprised of:

the fourth barrel rail that is:

in, at, or proximal the barrel bus distal narrow end wall of said cavity and electrically isolated from all other barrel rail thereat and

proximal the power rail thereat and

parallel said power rail and

of length similar said power rail's length, and

at similar location along the barrel cavity length as said power rail, and

said fourth rail has continuous barrel cavity surface along its length; and

surface on the first aft current shunt that has,

with the armature in the barrel cavity,

continuous electrical continuity with the barrel cavity surface of said fourth barrel rail; and

surface on the second forward current shunt that,

with the armature in the barrel cavity,

has continuous electrical continuity the barrel cavity surface of said fourth barrel rail and

with the armature in the barrel cavity,

the aft shunt-forward shunt circuit means maintains continuous electrical continuity between aft wall conductor of the first wall conductor assembly and forward wall conductor of the second wall conductor assembly, and

with the armature in the barrel cavity and power supplied to the power rails,

the aft shunt-forward shunt circuit means maintains a continuous current path between aft wall conductor of the first wall conductor assembly and forward wall conductor of the second wall conductor assembly; and

in which with

an outside power supply attached to said power rail connection means and

an armature in or inserted into the breach end of the barrel cavity,

the electric current path in the device effecting electromagnetic propulsion of the armature in the barrel cavity towards the barrel muzzle is extant and

the magnetic fields of the electric current in:

forward wall conductor and

aft wall conductor and

the barrel bus of each wall conductor assembly and

the barrel rails

interact with the electric current in the armature propulsion bus

creating forces in said propulsion bus

with cavity axis parallel, muzzle directed components

that propel the armature in the barrel cavity towards the barrel muzzle.

[Claim 16] Electromagnetic propulsion devices as claimed in claim 15 wherein an armature is retained in the breach end of the barrel cavity for release and propulsion in the barrel cavity towards the barrel muzzle on application of sufficient power to the power rails.

[Claim 17] Electromagnetic propulsion devices as claimed in claim 16 wherein the armature is retained at the cavity breach by a fuse pin which:

at one end is retained at one power rail and has electrical continuity therewith, and

at its other end is retained at the second power rail and has electrical continuity therewith, and

extends through an armature channel there between, and

with power supplied the power rails, provides a short circuit between said rails until vaporized and freeing the armature for traverse of the barrel cavity.

[Claim 18] Electromagnetic propulsion devices as claimed in claim 15 but wherein the propulsion bus-aft shunt circuit means is comprised an electric current bus in the armature located proximal the current shunts therein and between and connecting the armature's aft current shunt and the armature's propulsion bus.

[Claim 19] Electromagnetic propulsion devices as claimed in claim 15 but wherein said propulsion bus-aft shunt circuit means is comprised of an electric current bus in the armature located proximal the current shunts therein and between and connecting the armature's aft current shunt and the armature's propulsion bus.

[Claim 20] Electromagnetic propulsion devices as claimed in claim 15 but wherein:

the propulsion bus-aft shunt circuit means is comprised of:

an electric current bus in the armature that is located proximal the current shunts therein and is between and connects the armature's second aft current shunt and the propulsion bus; and

the aft shunt-forward shunt circuit means is comprised of:

an electric current bus in the armature that is located proximal the current shunts therein and is between and connects the armature's first aft current shunt and the armature's second forward current shunt.

[Claim 21] Electromagnetic propulsion devices as claimed in claim 15 but wherein said barrel and barrel cavity has a twist so that:

area elements in right sections to the barrel, when taken at incremental increasing distance from a barrel reference point, have like shape, area, and angle relative to each other at fixed radii about a barrel cavity axis at incremental increasing angular

displacement about said axis from an axial reference plane and the angular displacement per unite axial distance is constant; and

said armatures for use in said barrel cavity have

therein an axis coincident said barrel cavity axis and a like twist so that area elements in right sections to said armature, when taken at incremental increasing distance from an armature reference point, have like shape, area, and angle relative to each other at fixed radii about the said armature axis at incremental increasing angular displacement about said axis from an axial reference plane and the angular displacement per unite axial distance is constant and identical to said barrel and barrel cavity constant.