from a first position to a second position withdraws a rack that is coupled with the delivery catheter to withdraw the delivery catheter from over the occlusion device.

[0004] The release wire may be coupled with a delivery wire holder that is coupled to a spring assembly. In an embodiment, the spring-loaded release mechanism is a push button, and movement of the push button from the first position to the second position allows the spring assembly to withdraw the delivery wire holder and cause withdrawal of the release wire from the occlusion device. A core wire may additionally be coupled with the delivery wire holder. In an embodiment, movement of the spring-loaded release mechanism from the first position to the second position allows the spring assembly to withdraw the delivery wire holder and cause simultaneous withdrawal of the release wire and the core wire from the occlusion device.

[0005] In an embodiment, the spring assembly includes a damper ring and an extension spring. The spring assembly may further include a bore, a helical track along a wall of the bore, a piston, and an extension spring. Linear contraction of the extension spring causes axial motion of the piston and the damper ring within the bore and rotational motion of the damper ring along the helical track. In this manner, a spring force associated with linear contraction of the extension spring is dampened by a drag force associated with rotational motion of the damper ring along a helical track in a bore. This piston may be the delivery wire holder of the delivery system. Alternatively, the spring assembly can be a self-contained modular spring assembly that includes a coupler coupled with piston and extending outside of a housing. In this manner, the self-contained modular spring assembly can be a separate component, for example, that could be inserted into the delivery system.

[0006] The bore and helical track can be formed in a variety of configurations. For example, the bore and helical track can be formed from a casing of the handle. In an embodiment, the damper ring includes one or more lugs that travel within a matching quantity of paths in the helical track. The damper ring or bore can be designed to an increasing drag force coefficient as the damper ring travels axially within the bore. In an embodiment, a pitch of the helical track is tightened along an axial length of the bore. In an embodiment, an inside diameter of the bore is reduced along an axial length of the bore. In an embodiment, the damper ring includes slots around a circumference of a tubular body of the damper ring. In an embodiment, the pitch of the helical track is tightened along an axial length of the bore, an inside diameter of the bore is reduced along the axial length of the bore, and the damper ring includes slots around a circumference of the tubular body of the damper ring. A number of additional dampening mechanisms and combinations are possible. For example, a surface roughness of the helical track can be increased along an axial length of the bore, or a dampening grease can be located within the

CLAIMS

What is claimed is:

1. A delivery system comprising:

a delivery catheter;

an occlusion device;

a handle coupled with the delivery catheter, the handle comprising a spring-loaded release mechanism movable from a first position to a second position to cause withdrawal of a release wire from the occlusion device.

2. The delivery system of claim 1, wherein the occlusion device comprises a self-expandable member.

3. The delivery system of claim 2, further comprising a half band coupled with the self-expandable member.

4. The delivery system of claim 3, wherein the release wire is threaded through the half band and holds the self-expandable member in a wound-down static state prior to movement of the spring-loaded release mechanism from the first position.

5. The delivery system of claim 4, wherein movement of the spring-loaded release mechanism from the first position to the second position withdraws the release wire from the half band causing the self-expandable member to expand.

6. The delivery system of claim 4, wherein movement of the spring-loaded release mechanism from the first position to the second position withdraws a distal end of the release wire into a distal end of the delivery catheter.

7. The delivery system of claim 1, further comprising a first release mechanism, and movement of the first release mechanism from a third position to a fourth position withdraws a rack that is coupled with the delivery catheter to withdraw the delivery catheter from over the occlusion device.

8. The delivery system of claim 1, wherein the release wire is coupled with a delivery wire holder that is coupled to a spring assembly.

9. The delivery system of claim 8, wherein the spring-loaded release mechanism is a push button, and movement of the push button from the first position to the second position allows the spring assembly to withdraw the delivery wire holder and cause withdrawal of the release wire from the occlusion device.

10. The delivery system of claim 8, wherein the spring assembly comprises a damper ring and an extension spring, and a spring force associated with linear contraction of the extension spring is dampened by a drag force associated with rotational motion of the damper ring along a helical track in a bore.

11. The delivery system of claim 10, wherein the bore and helical track are formed from a casing of the handle.

12. The delivery system of claim 10, wherein the damper ring comprises one or more lugs that travel within a matching quantity of paths in the helical track.

13. The delivery system of claim 10, wherein a drag force coefficient increases as the damper ring travels axially within the bore.

14. The delivery system of claim 10, wherein a pitch of the helical track is tightened along an axial length of the bore.

15. The delivery system of claim 10, wherein an inside diameter of the bore is reduced along an axial length of the bore.

16. The delivery system of claim 15, wherein the damper ring includes slots around a circumference of a tubular body of the damper ring.

17. The delivery system of claim 10, wherein a pitch of the helical track is tightened along an axial length of the bore, an inside diameter of the bore is reduced along the axial length of the

bore, and the damper ring includes slots around a circumference of a tubular body of the damper ring.

18. The delivery system of claim 10, wherein a surface roughness of the helical track increases along an axial length of the bore.

19. The delivery system of claim 10, further comprising a dampening grease within the helical track, wherein a viscosity of the dampening grease increases along an axial length of the bore.

20. The delivery system of claim 10, further comprising an elastic band that couples the delivery wire holder to the handle to provide an increase in a drag force coefficient as the extension spring linearly contracts.

21. The delivery system of claim 9, wherein the release wire and a core wire are coupled with the delivery wire holder.

22. The delivery system of claim 21, wherein movement of the push button from the first position to the second position allows the spring assembly to withdraw the delivery wire holder and cause simultaneous withdrawal of the release wire and the core wire from the occlusion device.