**I/We Claim:**

1. A jacking system for excavation construction of a T-shaped cross passage of a tunnel system, the cross passage communicating with at least one main channel, wherein the jacking system comprises a reaction frame and force transmission member, the force transmission member connects the reaction frame to a main tunnel segment, the main tunnel segment being located at a side of the reaction frame facing the cross passage and surrounding a starting end of the cross passage, the reaction frame is used to provide support for an excavation apparatus in an excavation direction, wherein supporting force is transmitted to the main tunnel segment surrounding the starting end of the cross passage via the force transmission member in a way that the force transmission member bears a pulling force.

2. The jacking system according to claim 1, wherein the force transmission member comprises a plurality of force transmission pull rods arranged spaced-apart around a circumferential direction of the cross passage.

3. The jacking system according to claim 2, wherein at least a part of the force transmission pull rods are directly connected to the main tunnel segment surrounding the starting end of the cross passage.

4. The jacking system according to claim 2, wherein the starting end of the cross passage is provided with a starting casing connected to the main tunnel segment, at least a part of the force transmission pull rods being connected to the starting casing.

5. The jacking system according to claim 2, wherein each of the force transmission pull rod is configured as an unpowered pull rod.

6. The jacking system according to claim 2, wherein each of the force transmission pull rod is configured as a powered pull rod capable of providing a driving force.

7. The jacking system according to claim 6, wherein the powered pull rod is a reverse pulling force hydraulic cylinder.

8. The jacking system according to claim 6, wherein each of the powered pull rods has

an independent control unit.

9. The jacking system according to any of claims 6-8, wherein the jacking system further comprises a slide rail extending along a central axis of the cross passage, the reaction frame being movable along the slide rail.

10. The jacking system according to claim 2, wherein one end of the force transmission pull rod is pivotally connected to the reaction frame, and/or the other end of the force transmission pull rod is pivotally connected to the main tunnel segment or to a starting casing connected to the main tunnel segment.

11. The jacking system according to claim 10, wherein a pivot axis of the force transmission pull rod is perpendicular to an axial direction of the cross passage.

12. The jacking system according to claim 2, wherein one end of each of the force transmission pull rod is removably connected to the reaction frame, and/or the other end of each of the force transmission pull rod is removably connected to the main tunnel segment or a starting casing connected to the main tunnel segment.

13. The jacking system according to any of claims 10-12, wherein each of the force transmission pull rod is removably disposed by a coupling device, the coupling device comprising:

a mounting base having two side walls which are opposite and spaced apart, an end of said force transmission pull rod being disposed between the two side walls; and

a pin, wherein the mounting base and an end of the force transmission pull rod are respectively provided with a mounting hole, and the pin passes through the mounting holes of the mounting base and the force transmission pull rod.

14. The jacking system according to claim 13, wherein the mounting base is fixedly disposed on the reaction frame, or the mounting base is fixed on the main tunnel segment, or the jacking system comprises a starting casing fixedly connected to the main tunnel segment, and the mounting base is fixed on the starting casing.

15. The jacking system according to claim 13, wherein an end of the force transmission

pull rod is provided with a fine adjustment structure, the mounting hole passes through the fine adjustment structure, and the fine adjustment structure has a drum-shaped outwardly-projecting circumferential surface surrounding the mounting hole.

16. The jacking system according to claim 1, wherein the force transmission member is configured as a barrel-shaped structuredisposed around the starting end of the cross passage.

17. The jacking system according to claim 16, wherein the barrel-shaped structure is directly connected to the main tunnel segment surrounding the starting end of the cross passage.

18. The jacking system according to claim 16, wherein the starting end of the cross passage is provided with a starting casing connected to the main tunnel segment, the barrel-shaped structure being connected to the starting casing.

19. The jacking system according to claim 17 or 18, wherein an axial end of the barrel-shaped structureis provided with a radially outwardly extending flange by which the barrel-shaped structure is connected and secured.

20. The jacking system according to claim 19, wherein a connection manner of the barrel-shaped structure comprises welding, bolting and/or riveting.

21. The jacking system according to claim 16, wherein a sidewall of the barrel-shaped structure is provided with reinforcing ribs.

22. The jacking system according to claim 16, wherein a sidewall of the barrel-shaped structure is provided with a material delivery hole therethrough.

23. The jacking system according to claim 16, wherein the barrel-shaped structure is an integrally formed structure or is assembled from at least two separate parts.

24. The jacking system according to claim 23, wherein when the barrel-shaped structure is assembled from at least two separate parts, the at least two separate parts are identical to each other.

25. The jacking system according to claim 1, wherein a side of the reaction frame facing the cross passage is provided with a jacking drive unit including a plurality of hydraulic cylinders in a quadrant-symmetrical manner and spaced-apart around a central axis of the cross passage.

26. The jacking system according to claim 25, wherein one end of the plurality of hydraulic cylinders is connected to the reaction frame and the other end is connected to an annular abutment memberwhich is used to abut against the excavation apparatus or a segment of the cross passage.

27. The jacking system according to claim 25, wherein the hydraulic cylinders are mounted on the reaction frame and at least partially disposed in an interior of the reaction frame .

28. The jacking system according to claim 25, wherein a corollary equipment of the jacking drive unit is disposed in the interior of the reaction frame, and the corollary equipment at least comprises a hydraulic control device, an oil pipe, an oil tank and/or a valve.

29. The jacking system according to claim 25, wherein each of the hydraulic cylinders comprises a cylinder barrel and a piston, a front end of the cylinder barrel being provided with a flange and the cylinder barrel abutting against the reaction frame via the flange in a direction opposite to the excavation direction.

30. The jacking system according to claim 29, wherein the flange is connected to the reaction frame by fasteners.

31. The jacking system according to claim 29, wherein a surface of the reaction frame is provided with a boss that abuts against the flange.

32. The jacking system according to claim 25, wherein the hydraulic cylinder comprises a cylinder barrel and a piston, a bottom of the cylinder barrel abutting against the reaction frame.

33. The jacking system according to claim 25, wherein the jacking system further comprises a trolley provided at the starting end, and the reaction frame is supported by the trolley (27), wherein the reaction frame is provided with an adjustment unit for adjusting a

relative position between the reaction frame and the trolley.

34. The jacking system according to claim 33, wherein the adjustment unit comprises adjustment drive cylinders disposed along three mutually orthogonal adjustment directions, and one of the adjustment directions is an excavation direction.

35. The jacking system according to claim 34, wherein the reaction frame is provided with lug portions on left and right sides of the excavation direction, and at least part of the adjustment drive cylinders are disposed on the lug portions.

36. The jacking system according to claim 34, wherein the adjustment unit comprises a first adjustment drive cylinder and a second adjustment drive cylinder at least in the excavation direction, and an adjustment stroke of the second adjustment drive cylinder is greater than that of the first adjustment drive cylinder.

37. The jacking system according to claim 36, wherein the second adjustment drive cylinder is disposed at bottom of the reaction frame.

38. The jacking system according to claim 1, wherein a side of the reaction frame away from the cross passage is provided with a travel space running through in an extension direction of the main tunnel.

39. The jacking system according to claim 38, wherein a travel platform is laid in the travel space.

40. The jacking system according to claim 39, wherein the travel platform is provided with a travel track extending in the extension direction of the main tunnel.

41. The jacking system according to claim 39, wherein the jacking system further comprises a working platform disposed on the main tunnel segment below the jacking system, the reaction frame and/or the travel platform being supported on the working platform.

42. The jacking system according to claim 38, wherein the jacking system further comprises additional force transmission member connecting the reaction frame to the main

tunnel segment at a side of the reaction frame away from the cross passage, a force of the excavation apparatus acting on the reaction frame is transmitted to the main tunnel segment via the force transmission member and the additional force transmission member, and the travel space extends through the additional force transmission member.

43. The jacking system according to claim 42, wherein the additional force transmission member comprises a plurality of support rods arranged about an axis of the cross passage, the plurality of support rods including an upper support rod portion and a lower support rod portion, and the travel space being disposed between the upper support rod portion and the lower support rod portion.

44. The jacking system according to claim 43, wherein the jacking system further comprises a bearing base having a surface shaped close to the main tunnel segment, and the plurality of support rods is coupled to the bearing base and supported on the main tunnel segment by the bearing base.

45. The jacking system according to claim 43, wherein the support rod comprises at least two sub-sections disposed in a lengthwise direction, and adjacent sub-sections are detachably connected and fixed to each other by a connector.

46. The jacking system according to claim 1, wherein a material delivery hole running through the reaction frame is disposed at a position of the reaction frame corresponding to the cross passage.

47. A method of using the jacking system according to any of claims 1-46 for excavation construction of a T-shaped cross passage of a tunnel system, wherein the method comprises:

delivering a jacking system, an excavation apparatus and a corollary equipment to a position where a cross passage is to be excavated, and fixing them;

adjusting positions of the jacking system and the excavation apparatus according to a planned excavation direction;

connecting a reaction frame to a main tunnel segment through a force transmission member;

moving the excavation apparatus to a planned starting position;

excavating and assembling cross passage modular units which form at least a part of a

main structure of the cross passage after being assembled;

repeating excavating and assembling steps till construction of the cross passage is completed.

48. The method according to claim 47, wherein before the step of delivering a jacking system, an excavation apparatus and a corollary equipment to a position where a cross passage is to be excavated, the method further comprises:

combining the corollary equipment, the jacking system and the excavation apparatus into a unitary structure.

49. The method according to claim 47, wherein the corollary equipment comprises a starting casing, and the method further comprises:

connecting the starting casing with the main tunnel segment, and connecting the reaction frame to the starting casing via a force transmission member.

50. The method according to claim 47, wherein the excavation apparatus is a shield tunneling machine, and the method further comprises, prior to the step of excavating and assembling cross passage modular units:

mounting a pre-starting auxiliary segment and a steel structure.

51. The method according to claim 47, wherein the excavation apparatus is a pipe jacking tunneling machine, the force transmission member is an unpowered force transmission pull rod, the cross passage modular unit is a pipe section, and the method further comprises, prior to the step of excavating and assembling cross passage modular units:

mounting a jacking drive unit which acts directly on the reaction frame.

52. The method according to claim 51, wherein the step of excavating and assembling cross passage modular units comprises:

using the pipe jacking machine to complete spatial advancement of the pipe section;

disconnecting and removing at least part of the force transmission pull rods that interfere with a pipe section delivery passage, from the pipe section delivery passage;

retracting the jacking drive unit;

delivering the pipe section to an assembling position to complete assembling;

extending the jacking drive unit out to complete close contact with the assembled pipe

section;

restoring the force transmission pull rod to a connected state.

53. The method according to claim 47, wherein the excavation apparatus is the pipe jacking tunneling machine, the force transmission member is a force transmission pull rod capable of providing a driving force, the cross passage modular unit is a pipe section, and the step of excavating and assembling cross passage modular units comprises:

disconnecting and removing the force transmission pull rods that interfere with a pipe section delivery passage, from the pipe section delivery passage;

delivering the pipe section to an assembling position to complete assembling;

restoring the force transmission pull rod to a connected state;

driving the force transmission pull rod to push the pipe jacking method tunneling machine forward via the reaction frame to complete the excavation of the pipe section;

driving the force transmission pull rod reversely to retract the reaction frame.

54. The method according to claim 53, wherein before the step of driving the force transmission pull rod reversely to retract the reaction frame, the method comprises:

fixing a pipe section closest to the reaction frame by a retaining device.

55. A jacking system for excavation construction of a T-shaped cross passage of a tunnel system, the cross passage communicating with a main tunnel at least at a receiving end in an excavation direction, wherein the jacking system comprises a reaction frame and a plurality of force transmission pull rods, an end of each of the force transmission pull rods is connected to the reaction frame, the other end of each of the transmission pull rods passes through a soil layer and is connected to a main tunnel segment surrounding the receiving end of the cross passage, the reaction frame is used to provide support for an excavation apparatus in an excavation direction, wherein a supporting force is transmitted to the main tunnel segment surrounding the receiving end of the cross passage via the force transmission pull rods in a way that the force transmillion pull rods bear a pulling force.

56. The jacking system according to claim 55, wherein an inner surface of the main tunnel segmentsurrounding the receiving end of the cross passage is provided with a bearing base, and the force transmission pull rods pass through the main tunnel segment and are connected to the bearing base.

57. The jacking system according to claim 56, wherein the bearing base is a structure that is separate from the main tunnel segment and has sides shaped close to an inner surface of the main tunnel segment.

58. The jacking system according to claim 57, wherein the bearing base is a steel structure.

59. The jacking system according to claim 56, wherein the bearing base is a prefabricated reinforced concrete structure integrally disposed with the main tunnel segment.

60. The jacking system according to claim 56, wherein an end of the force transmission pull rod passes through the bearing base and is locked with fasteners.

61. The jacking system according to claim 60, wherein the end of the force transmission pull rod is provided with a slot perpendicular to an axial direction thereof, and the fastener is configured as a clip fixed on the bearing base, and the clip is snap-fitted with the slot.

62. The jacking system according to claim 60, wherein the end of the force transmission pull rod is provided with a threaded structure, and the fastener is configured as a locking nut that threadably engages the threaded structure.

63. The jacking system according to claim 62, wherein a washer is disposed between the locking nut and the bearing base.

64. The jacking system according to claim 60, wherein the end of the force transmission pull rod is provided with a through hole extending therethrough in a direction perpendicular to its own axial direction, and the fastener is configured as a locking pin (323c) extending through the through hole.

65. The jacking system according to claim 56, wherein a plurality of the force transmission pull rods are connected to the same bearing base.

66. The jacking system according to claim 55, wherein each pull rod comprises a

plurality of sub-sections arranged in an axial direction thereof, with adjacent sub-sections being connected and secured by a connector.

67. The jacking system according to claim 66, wherein a structural strength of the connector is not lower than that of the sub-sections.

68. The jacking system according to claim 55, wherein the force transmission pull rod comprises a hollow tube and a force transmission cable passing through the hollow tube, wherein the hollow tube is disposed in the soil layer, and the force transmission cable is configured to connect with the reaction frame and the main tunnel segment surrounding the receiving end of the cross passage.

69. The jacking system according to claim 55, wherein the force transmission pull rod is made of threaded steel.

70. The jacking system according to claim 55, wherein a sealing structure for waterproofing is provided at a position of the main tunnel segment where the force transmission pull rod passes.