CLAIMS

1. A manufacturing method of a concrete pile that uses a formwork in which a drainage hole connected to outside is provided on a molding surface and in which a pile molding space can be reduced and enlarged, the method comprising:

pouring concrete in the pile molding space, reducing the pile molding space to compress and mold the concrete, draining water drained from the concrete by compression and molding outside of the formwork from the drainage hole, and holding the concrete a predetermined amount of time to harden the concrete,

wherein,

the formwork includes an outer formwork that molds an outer wall surface of the concrete pile, an inner formwork that molds an inner wall surface of a hollow space of the concrete pile, and a pair of end formwork that mold upper and lower end surfaces of the concrete pile, and

the outer formwork includes a plurality of components, the drainage hole is a gap between the adjacent components when the mold is tightened, and the gap is configured to be capable of being opened larger during cleaning than when the mold is tightened,

wherein the plurality of components are linked with a hinge and the drainage hole is a slit shape.

2. The manufacturing method of the concrete pile according to claim~~s~~ 1, wherein, the drainage hole is a shape that spreads outside from an opening end on the molding surface.

~~3. The manufacturing method of the concrete pile according to claim 1 or 2, wherein, the drainage hole is a slit shape.~~

43. The manufacturing method of the concrete pile according to any one of claims 1 to 32, wherein, a moving member that slides a portion of the outer formwork with relation to another adjacent portion along a direction perpendicular to an axis direction of the pile molding space is used, and the moving member is used to reduce and enlarge the pile molding space.

54. The manufacturing method of the concrete pile according to any one of claims 1 to 43, wherein, the inner formwork includes a pair of cores each including a tapered surface which shrinks in diameter toward a tip along an axis direction of the pile molding space, and the tips are positioned to face each other,

the end formwork supports a rear end of the pair of cores in a slidable manner,

a moving member that slides at least one core along the axis direction so that the tips of the pair of cores are brought close or separated is used, and the moving member is used to reduce and enlarge the pile molding space.

65. The manufacturing method of the concrete pile according to any one of claims 1 to 54, wherein, a tension material that extends in an axis direction of the pile molding space and a pair of metal joints fixed to both ends of the tension material are stored in the pile molding space, and the concrete is compressed and molded.

76. The manufacturing method of the concrete pile according to claim 65, wherein,

the pair of metal joints includes a connection hole for the tension material,

two or more types of metal joints are manufactured with one or two or more among a number of the connection holes, a position, and an inner diameter set to be different, and

one type is selected from the two or more types of metal joints and the tension

material is positioned according to the selected metal joint.

~~8~~7. The manufacturing method of the concrete pile according to any one of claims 1 to ~~7~~6, wherein, a partition is positioned in the pile molding space in any position in an axis direction and the partition divides the pile molding space in the axis direction, and the concrete is poured in one side or both sides of the partition and the concrete pile with any length shorter than a length of the pile molding space in the axis direction can be manufactured.

~~9~~8. The manufacturing method of the concrete pile according to claim ~~5~~4, wherein,

a tension material extending in an axis direction of the pile molding space is stored in the pile molding space,

one end of the tension material is latched to one core of the pair of cores, and the other end of the tension material is latched to the other core of the pair of cores,

the moving member is used to extend the pair of cores in the axis direction to enlarge the pile molding space and to create tensile stress in the tension material,

the outer formwork and the end formwork restrains the tension material in a state in which the tensile stress is created, and

the concrete is poured in the pile molding space, the moving member is used to contract the pair of cores in the axis direction to reduce the pile molding space and the concrete is compressed and molded, the water drained from the concrete by compression and molding is drained outside of the formwork from the drainage hole, and the concrete is hardened held for a predetermined amount of time in a state with the tensile stress created in the tension material.

~~10~~9. A manufacturing device of a concrete pile comprising:

a formwork that compresses and molds the concrete pile, and

a drainage hole that is provided in a molding surface of the formwork and that is connected to outside,

wherein, the formwork is configured to be capable of reducing and enlarging a pile molding space and the concrete pile is compressed and molded,

wherein,

the formwork includes an outer formwork that molds an outer wall surface of the concrete pile, an inner formwork that molds an inner wall surface of a hollow space of the concrete pile, and a pair of end formwork that mold upper and lower end surfaces of the concrete pile, and

the outer formwork includes a plurality of components, the drainage hole is a gap between the adjacent components when the mold is tightened, and the gap is configured to be capable of being opened larger during cleaning than when the mold is tightened,

wherein the plurality of components are linked with a hinge and the drainage hole is a slit shape.

~~11. The manufacturing device of the concrete pile according to claim 10, wherein, the plurality of components are linked with a hinge.~~

~~12~~10. The manufacturing device of the concrete pile according to claim ~~10 or 11~~9, wherein, the drainage hole is a shape that spreads outside from an opening end on the molding surface.

~~13. The manufacturing device of the concrete pile according to any one of claims 10 to 12, wherein, the drainage hole is a slit shape.~~

~~14~~11. The manufacturing device of the concrete pile according to any one of claims

~~10~~9 to ~~13~~10, further comprising a moving member that slides a portion of the outer formwork with relation to another adjacent portion along a direction perpendicular to the axis direction of the pile molding space, wherein, the moving member is configured to be capable of reducing and enlarging the pile molding space.

~~15~~12. The manufacturing device of the concrete pile according to any one of claims ~~10~~9 to ~~14~~11, wherein,

the inner formwork includes a pair of cores each including a tapered surface which shrinks in diameter toward a tip along an axis direction of the pile molding space and the tips are positioned to face each other,

the end formwork is configured to be capable of supporting a rear end of the pair of cores in a slidable manner,

the device further comprises a moving member that slides at least one core along the axis direction and brings close and separates the tips of the pair of cores, and wherein the moving member is configured to be capable of reducing and enlarging the pile molding space.

~~16~~13. The manufacturing device of the concrete pile according to claim ~~15~~12, wherein,

the pair of end formwork include a hole through which both ends of the tension material extending in the axis direction in the pile molding space are able to penetrate and are able to extend outside of the end formwork,

the device further comprises a first latching tool that latches both ends of the tension material extending from the hole to the pair of cores, and a second latching tool that latches both ends of the tension material extending from the hole to the pair of end formwork,

in addition to using the first latching tool, the moving member is used to extend

the pair of cores in the axis direction, the pile molding space is enlarged, and tensile stress can be created in the tension material, and

the second latching tool is configured to be capable of being used to constrain the tension member in a state that tensile stress is created by the outer formwork and the end formwork.