## CLAIMS

1. A suction dredger for use on an underwater hard soil layer, comprising:

a mud suctioning mechanism, which comprises a pressurizing assembly and a suction dredging pipe (10), the suction dredging pipe (10) is penetrated on the pressurizing assembly and two ends thereof at least partially extend out of the pressurizing assembly, a side wall of a pipe section of the suction dredging pipe (10) located in the pressurizing assembly is provided with a plurality of pressurization holes (11) that are inclined upward in a direction from an outer wall to an inner wall, and the pressurizing assembly is configured to discharge mud water mixtures in the suction dredging pipe (10) by means of the pressurization holes (11);

a mud-breaking mechanism, which comprises at least two mud-breaking assemblies (20), the mud-breaking assemblies (20) are arranged on a bottom of the mud suctioning mechanism and are configured to crush the underwater hard soil layer to assist the suction dredging pipe (10) in suctioning mud; and

a blockage-prevention assembly (3), which is arranged on a bottom of the suction dredging pipe (10), and the blockage-prevention assembly (3) is configured to prevent the suction dredging pipe (10) from experiencing blockages during a suction process;

wherein the pressurizing assembly comprises:

an air collecting box (12), which comprises an air collecting cavity, and the air collecting box (12) is configured such that: the suction dredging pipe (10) is penetrated on the air collecting box (12) and the pressurization holes (11) located on the suction dredging pipe (10) all communicate with the air collecting cavity; and

a high-pressure air pump, which is arranged above the air collecting box (12), and is connected with a top of the air collecting box (12) through a pipeline, and communicates with the air collecting cavity, and the high-pressure air pump is configured to inject air with a high flow rate into the air collecting cavity to discharge the mud water mixtures in the suction dredging pipe (10);

wherein the mud-breaking mechanism comprises:

a diversion pipe (21), which is arranged in the air collecting cavity, at least two water outlets are arranged on a pipe section of the diversion pipe (21) at intervals, and each of the water outlets is connected with one of the mud-breaking assemblies (20); and

a high-pressure water pump, which is arranged above the air collecting box (12), and is connected with one end of the diversion pipe (21) through a pipeline;

wherein the mud-breaking assembly (20) comprises a water jet pipe (22) and a nozzle (23) arranged at an end of the water jet pipe (22), the water jet pipe (22) communicates with the

corresponding water outlet, a connection between the water jet pipe (22) and the water outlet is also provided with a rotating part, the rotating part is connected with a driving motor, and the driving motor is configured to drive the rotating part to rotate to adjust an angle of the water jet pipe (22).

2. The suction dredger for use on the underwater hard soil layer according to claim 1, wherein the blockage-prevention assembly (3) is detachably clamped with the suction dredging pipe (10), one end of the blockage-prevention assembly (3) away from the suction dredging pipe (10) is in a serrated shape, and a grid in the shape of a well is arranged in the blockage-prevention assembly (3).

3. The suction dredger for use on the underwater hard soil layer according to claim 1, wherein the blockage-prevention assembly (3) comprises a connecting head and at least three curved blockage-prevention parts, the connecting head is annular and rotatably connected with the bottom of the suction dredging pipe (10), one ends of all the curved blockage-prevention parts are arranged on the connecting head at intervals, and the bottom of the suction dredging pipe (10) is within a vertical projection area of all the curved blockage-prevention parts, and a plurality of blockage-prevention heads are arranged on both sides of each of the curved blockage-prevention parts at intervals.

4. The suction dredger for use on the underwater hard soil layer according to claim 1, wherein an included angle between the pressurization hole (11) and a horizontal plane is not less than 45°.

5. The suction dredger for use on the underwater hard soil layer according to claim 1, wherein a top of the suction dredging pipe (10) is also connected with a mud discharge pipe (13), the mud discharge pipe (13) is L-shaped, and a corner thereof is arc-shaped.

6. The suction dredger for use on the underwater hard soil layer according to claim 5, the suction dredging pipe (10) and the mud discharge pipe (13) are connected by means of a connecting flange, and the air collecting box (12) is also connected with a pipeline located at the top thereof by means of a connecting flange.

7. The suction dredger for use on the underwater hard soil layer according to claim 1, wherein the number of the mud-breaking assemblies (20) is 4 to 8.