Claims

1. Device (10) for removal of sediment from inside piles (40) which are at least partially immersed in water, **characterized in** comprising an outer guiding unit (11) adapted for temporary positioning on top of a pile, the outer guiding unit (11) enveloping at least one inner dredging unit (12) which is arranged to be lowered from the outer guiding unit (11), wherein the inner dredging unit (12) at its lower end comprises movable jet nozzles (34) arranged to loosen sediment, the dredging unit (12) furthermore comprising a central passage (35) which is in communication with a discharge hose (16) arranged to transport loosened sediment therefrom.

2. Device (10) as claimed in claim 1, wherein the outer guiding unit at its lower end exhibits at least one attachment member (111) suitable for being attached to a hollow pile top.

3. Device (10) as claimed in claim 1 or 2, wherein the movable jet nozzles (34) are arranged on at least one foot (33), the movement of the nozzles (34) being achieved by at least one of i) nozzles being movable in relation to the foot (33), ii) the foot (33) being at least partly pivotal, iii) the dredging unit (12) being pivotal in relation to the guiding unit (11).

4. Device (10) as claimed in claim 3, wherein the inner dredging unit (12) is arranged to be moved vertically up and down independently of the operation of the nozzles (34).

5. Device (10) as claimed in claim 3 or 4, wherein the foot (33) is arranged to be rotated either continuously in one direction or to be turned back and forth within a defined maximum angular area.

6. Device (10) as claimed in any preceding claim, wherein water to the nozzles (34) are charged through swivels or flexible hoses.

7. Device (10) as claimed in any preceding claim, wherein the jet nozzles (34) receives water from at least one water pump (17, 19) in the inner dredging unit (12).

8. Device (10) as claimed in any one of claims 3 to 7, wherein the foot (33) has a cross-section selected among a circular disc and extending arms.

9. Device (10) as claimed in any preceding claim, wherein the dredging unit (12) furthermore is equipped with teeth (36) to mechanically loosen sediment.

10. Device (10) as claimed in claim 9, wherein the teeth (36) are moveable by being attached to a pivotal foot (33).

11. Device (10) as claimed in any preceding claim, wherein the device (10) is supplied with at least one of electric energy and hydraulic energy.

12. Device (10) as claimed in any preceding claim, wherein the inner dredging unit (12) comprises an ejector pump (18) arranged to induce a section force in the discharge hose (16).

13. Device (10) as claimed in any preceding claim, wherein the inner dredging unit (12) furthermore comprises lateral cleaning nozzles receiving water from a water pump (17).

14. Device (10) as claimed in any one of claims 3 to 13, wherein the foot (13) is an element of a rotatable part (30) which also comprises a cleaning disc (31) provided with lateral cleaning nozzles receiving water from a water pump (17).

15. Device (10) as claimed in any preceding claim, wherein the rotatable part (30) furthermore comprises brushes arranged to brush the internal walls of a pile (40).

16. Device (10) as claimed in any preceding claim, wherein the inner dredging unit (12) is provided with a high-pressure or ultrahigh-pressure pump (19) arranged to provide separate jet nozzles (34) with water of a pressure significantly higher than the pressure provided by water pump (17), more than 100 bar, preferably more than 200 bar, typically 500 to 2000 bar.

17. Device (10) as claimed in any preceding claim, wherein the pivotal foot (33) is turned by a motor (20) which is powered either electrically or hydraulically.

18. Device (10) as claimed in any preceding claim, wherein the inner dredging unit (12) is arranged to be lowered from the outer guiding unit (11) by a device selected among a winch (14) and a wire (14), pitch rack and hydraulic cylinder.

19. Device (10) as claimed in any preceding claim, wherein the inner dredging unit (12) exhibits permanent or detachable hydraulic cutting equipment.

20. Device (10) as claimed in any preceding claim, wherein inner dredging unit (12) is arranged to connect to other tools suitable for performing work within the pile and on the pile wall.