A water cooling stretch for cooling rolling stock coming from a roll train has several parallel and adjacent positioned cooling pipes having different diameters matching differently sized rolling stock. The cooling pipes are made of individual cooling pipe sections arranged successively in a straight cooling pipe arrangement, respectively. A cooling water supply of individual cooling head nozzle elements supplies the cooling water to the cooling pipe sections. Valve arrangements for controlling the supply of cooling water are provided. The cooling pipe arrangement has individual water box modules arranged between the cooling pipe sections, and the cooling pipe sections have inlet and outlet openings that open into the water box modules. The water box modules are fastened to a common water supply line moveable horizontally and transversely to a movement path of the rolling stock for moving the cooling pipe arrangements into and out of the movement path, as needed.
WATER COOLING STRETCH FOR COOLING WIRE ROD OR SMALL SECTIONS OF STEEL.

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The invention relates to a water cooling stretch for cooling rolling stock such as wire or small sections of steel coming from by a roll train, wherein the water cooling stretch comprises several adjacently positioned cooling pipes which have different inner diameters matching the different cross-sections of the rolling stock and which form a cooling pipe arrangement, respectively, comprised of several pipe sections arranged in a straight succession. They are arranged together on a support, movable horizontally and transversely to the movement path of the rolling stock, and can be moved as needed into and out of the movement path, wherein the cooling water supply to the individual cooling pipe sections is realized by cooling head nozzles and correlated inflow-controllable valvatures.

[0003] 2. Description of the Related Art

[0004] Devices of the aforementioned kind are described, for example, in German patent application DE 199 60 638, not published as of the priority date of the instant application for patent. This document describes a water cooling stretch comprised of several parallel and adjacently positioned cooling pipes with different inner diameters arranged on a transversely movable support configured for moving the cooling pipes into and out of the movement path of the rolling stock. These cooling pipes are arranged with the support in a water box and have a common cooling head arranged at its inlet openings and comprising several correspondingly sized nozzles for the cooling water correlated with the cooling head. These nozzles have arranged upstream thereof a rotary slide valve which supplies a nozzle which is currently in a working position with cooling water, respectively. Instead of this rotary slide valve, as explained in more detail later on in this document, other control devices, for example, regulating flaps, slide valves or individual valves can be used. This configuration has the disadvantage that the exchange of cooling pipes and of the cooling heads and control devices connected therewith entails a considerable constructive expenditure and requires experienced personnel for the exchange procedure.

SUMMARY OF THE INVENTION

[0005] It is an object of the present invention to decrease the constructive expenditure for water cooling stretches of the aforementioned kind and to simplify their operation.

[0006] In accordance with the present invention, this is achieved in that the inlet and outlet openings of the individual cooling pipe sections of the cooling pipe arrangement open into independent water box modules which together are arranged fixedly on a water supply pipe which forms the horizontally movable support.

[0007] Based on the discussed prior art, which is an application filed by the instant applicant, according to which a series of cooling pipe sections is arranged successively in a common cooling water box and cooling heads, which are secured by threaded securing elements, are connectable with the inlet openings of the individual cooling pipe sections, wherein the water supply of the cooling heads is realized by separate supply pipes and by high-speed switching valves provided external to the water box, the aforementioned object is solved according to the invention in that the inlet and outlet openings of the individual pipe sections of the cooling pipe arrangement open into individual water box modules which are arranged together fixedly on a water supply pipe which forms a horizontally movable support. In this connection, in each one of the water box modules individual independent cooling head nozzle elements can be used which are exchangeable between the openings of the respective pipe sections of the cooling pipe arrangement and connectable with correlated high-speed switching valves. In the water box modules arranged at the beginning and the end of the water cooling stretch it is possible to provide blow nozzle elements, arranged so as to be exchangeable also, upstream or downstream of the cooling head nozzle elements, and, moreover, these water box modules can comprise adjusting or control elements for adjusting the cooling head nozzle elements and the blow nozzle elements. The water box modules have expeditiously a pivotable and lockable cover in which clamped securing elements for the cooling head nozzle elements and the blow nozzle elements are arranged. Moreover, in the water box modules pneumatically or hydraulically actuated high-speed switching flaps can be provided which are connected with the water supply device.

BRIEF DESCRIPTION OF THE DRAWING

[0009] In the drawing:

[0010] FIG. 1 is a water cooling stretch in a longitudinal section viewed from the side;

[0011] FIG. 2 is a plan view onto a portion of the water cooling stretch in a horizontal section on an enlarged scale; and

[0012] FIG. 3 is a section along the line A-A of FIG. 1 on an enlarged scale.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0013] In FIG. 1 it is shown that water box modules WKM, in the disclosed embodiment four such modules, are positioned at a spacing to one another on the water supply pipe WZR and are fixedly connected thereto in a way not illustrated in more detail. The water supply pipe WZR rests with slide supports ST horizontally moveable in the direction of double arrow P (see FIG. 2), on stationary foundations F and can be moved in a way not illustrated by means of cylinder devices or other adjusting or advancing elements.
in a horizontal plane. Cooling pipe sections are arranged at a spacing adjacent to one another in a horizontal plane at the neighboring water box modules WKMa, WKMb, WKMc, and WKMD. In the illustrated embodiment three such pipe sections, respectively, are provided. In FIG. 2, they are identified by KRA1, KRA2, KRA3. They are secured by the sidewalls SW of the respective water module WKM. They have different inner diameters d1, d2, d3 and project with their openings M1, M2, M3 into the water box module WKM.

[0014] High-speed switching valves SSV1, SSV2, SSV3 are arranged in the water box modules (compare FIG. 3) and are supported on the water supply pipe WZR. Cooling head nozzle elements KDE1, KDE2, KDE3 can be placed in an exchangeable way onto the switching valves and can be fastened, in a way not illustrated, by means of pneumatically or hydraulically actuated cylinder devices, springs, wedges or even with screws in a detachable way, or, as illustrated, can be clamped by a clamping element SP which is connected to the cover AD that is pivotally connected to the water box module WKM. In the water box modules WKMa and WKMD at the beginning and the end of the water cooling stretch, blow nozzle elements BLE1, BLE2, BLE3 can be used in addition to the cooling head nozzle elements KDE1 and KDE2 and are arranged upstream or downstream thereof. They are also exchangeably mounted and can be secured in the same way as described above for the cooling head nozzle elements KDE. These cooling head nozzle elements and the blow nozzle elements, after having been mounted, can be adjusted in a way not illustrated by means of threads and guides or clamping nuts against stops. Moreover, pneumatically or hydraulically actuated high-speed switching flaps for suppressing pressure peaks of the water supply pipe WZR can be arranged in the water box modules WKM.

[0015] While specific embodiments of the invention have been shown and described in detail to illustrate the inventive principles, it will be understood that the invention may be embodied otherwise without departing from such principles.

What is claimed is:

1. A water cooling stretch for cooling rolling stock coming form a roll train, the water cooling stretch comprising:

- several parallel and adjacently positioned cooling pipes having different diameters matching different cross-sections of the rolling stock and comprised of individual cooling pipe sections arranged successively to form a straight cooling pipe arrangement, respectively;

- a cooling water supply comprising individual cooling head nozzle elements, configured to supply the cooling water to the individual cooling pipe sections, and further comprising valve arrangements configured to control the supply of cooling water;

- wherein the cooling pipe arrangements comprises individual water box modules arranged between the cooling pipe sections and wherein the individual cooling pipe sections have inlet openings and outlet openings that open into the water box modules;

- a common support on which the water box modules are fixedly connected, wherein the common support is configured to be moveable horizontally and transversely to a movement path of the rolling stock in order to move the water box modules and the cooling pipe sections into and out of the movement path of the rolling stock, as needed;

wherein the common support is a water supply pipe.

2. The water cooling stretch according to claim 1, wherein:

- each one of the water box modules receives individual ones of the cooling head nozzle elements so as to be exchangeably arranged in the water box modules between the inlet opening and the outlet opening of the cooling pipe sections connected to the water box modules;

- each one of the water box modules receives one of the valve arrangements comprising high-speed switching valves correlated with the cooling head nozzle elements, wherein the cooling head nozzle elements are configured to be connected to the high-speed switching valves.

3. The water cooling stretch according to claim 2, wherein a first one and a last one of the water box modules located at a beginning and an end of the cooling water stretch comprise exchangeable blow nozzle elements arranged downstream of the cooling head nozzle elements in the first and last water box modules.

4. The water cooling stretch according to claim 3, wherein the water box modules comprise adjusting elements configured to adjust the cooling head nozzle elements and the blow nozzle elements.

5. The water cooling stretch according to claim 3, wherein the water box modules comprise pivotable and lockable covers.

6. The water cooling stretch according to claim 5, wherein the covers have clamping elements configured to secure the cooling head nozzle elements and the blow nozzle elements.

7. The water cooling stretch according to claim 2, wherein the water box modules comprise adjusting elements configured to adjust the cooling head nozzle elements.

8. The water cooling stretch according to claim 2, wherein the water box modules comprise pivotable and lockable covers.

9. The water cooling stretch according to claim 8, wherein the covers have clamping elements configured to secure the cooling head nozzle elements.

10. The water cooling stretch according to claim 1, wherein the water supply device comprises pneumatic or hydraulic high-speed flaps arranged in the water box modules and connected to the water supply pipe.