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(54) A FILTER PRESS INCLUDING A FILTER CLOTH WASHING DEVICE

(71) We, NIPPON GAISHI KABUSHIKI KAISHA of No. 2-56, Suda-Cho, Mizuho-Ku, Nagoya City, Japan, a company organized according to the laws of Japan, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:-

This invention relates to a filter press including a filter cloth washing device, wherein each filter cloth provided for every filter plate travels individually and is washed by a spraying pipe attached to that filter plate.

Hitherto, it has been usual that filter cloths clogged due to cyclical dehydrating operations are washed by spraying pressurized water thereon.

A well-known filter cloth washing device for a travelling filter cloth type filter press, in which each filter cloth provided for every filter plate is adapted to travel individually, is so arranged that, as shown in Figure 1, a plurality of washing water pipes 2, having a plurality of water spraying nozzles, and substantially equal in length to a width of a filter cloth run below respective filter plates 1, 1' ... in parallel relation thereto. A washing water header pipe 5 runs between a front fixed frame 3 and a rear fixed frame 4 of the filter press, which water header pipe is long enough to cover the distance between these fixed frames 3 and 4. The washing water header pipe 5 and respective water pipes 2 running below filter plates 1, 1' ... are connected to each other by means of pressurized rubber hoses 6.

In discharging cakes or washing the filter cloths, this prior art device has the following disadvantages. That is to say, in case all of filter plates 1, 1' ... must be opened simultaneously the distances of shift of the filter plates which are located at the side close to the movable frame 7 are much larger than

that of the filter plates which are located at the side close to fixed frame 3. For this reason, with such a washing device, pressure rubber hoses 6 connecting water pipes 2 below respective filter plates 1, 1' ... with washing water header pipe 5 must be increased in length towards the filter plate located on the side of the movable frame 7. A shortcoming is thus encountered with the existing frame press having a large number of filter plates in that a number of long, washing, pressure rubber hoses 6 project in a bent state to the lower portion of the side wall of the filter press, and these hoses are likely to entangle one another in the portion close to the filter plates, thus greatly reducing the peripheral maintenance space of the filter press.

It is accordingly an object of the present invention to provide a filter cloth washing device for a filter press, wherein regardless of the increase in number of filter plates, water for washing the increased number of filter cloths may be supplied by increasing the number of pressure rubber hoses, each of which is the same in length and type, without the need for preparing pressure rubber hoses which are different in length and type, thereby providing an increased, effective maintenance space in the area close to the filter press.

To attain this object, there is provided according to the present invention a filter press comprising a plurality of filter plates, a respective movable filter cloth associated with each filter plate and trained about a respective roller positioned below its respective filter plate and a device for washing the filter cloths, which device comprises a plurality of washing water supply pipes, each pipe being associated with a respective filter cloth, having a plurality of spraying nozzles and running in parallel to the roller about which the associated filter cloth is trained, a plurality of coupling means each connected

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to one end of a respective one of said water supply pipes, each of said coupling means having an inner diameter larger than the inner diameter of its respective water supply pipe and first and second communication ports, and either all the coupling means being connected in series for flow of washing water or alternate coupling means being connected in series for flow of washing water, each connection between two coupling means comprising two flexible pressure pipes interconnected by a metallic joint, and the arrangement being such that each coupling means which is connected to an upstream and a downstream coupling means has one of its communication ports connected by way of two said flexible pressure hoses connected together by a said metallic joint to one of the communication ports in the upstream coupling means and its other communication port connected by way of another two said flexible pressure hoses connected through another said metallic joint to a communication port in the downstream coupling means.

The invention will now be described in greater detail with reference to the accompanying drawings, wherein:

Figure 1 is a schematic side view of a prior art filter cloth washing device in a travelling filter cloth type filter press;

Figure 2 is a schematic side view of a filter cloth washing device in a filter press, according to the present invention; and

Figure 3 is a fragmentary perspective view of the press in *Figure 2*.

Referring to *Figures 2* and *3* which are illustrative of the present invention, there is provided a plurality of washing water supply pipes 12 each having water-spraying nozzles 11 for spraying water to a respective filter cloth 10 trained about filter plate 8 and lower roller 9 provided below the bottom end of the respective filter plate 8. Each water supply pipe 12 runs below its respective lower roller 9 in parallel thereto, with its spraying nozzles 11 directed towards the respective filter cloth 10, and is fixedly retained below the filter plate 8 by its respective coupling means 13. Each coupling means 13, by which a water supply pipe is fixedly retained at one end thereof, has a bore 14 having an inner diameter D larger than an inner diameter d of water supply pipe 12 connected thereto, and bore 14 communicates with the corresponding water supply pipe 12. Each coupling means 13 has a first (or inner) communication port such as 15a, 15c and a second (or outer) communication port such as 15b, 15d both of which are open to bore 14.

First communication port 15a in one coupling means 13 attached to one filter plate 8 is connected by way of two flexible pressure hoses 16 to a first communication

port 15c in another coupling means 13 attached to another filter plate 8 upstream of the aforesaid one filter plate 8, and second communication port 15b in the aforesaid one coupling means 13 is connected by way of another two flexible pressure hoses 16 to a second communication port 15d in yet another coupling means 13 attached to yet another filter plate 8 downstream of the aforesaid one filter plate.

First communication port 15a (or second communication port 15b) in one coupling means 13 may be connected to either first communication port 15c or second communication port 15d in another coupling means 13, as long as the result of the connection is one downstream and one upstream of the said one coupling means. It is, however, preferable that, the first communication port 15c in one coupling means is connected to the first communication port 15a in the neighboring coupling means, and the outer communication port 15b in that neighbouring coupling means is connected to the outer communication port 15d in the next neighboring coupling means so that respective flexible pressure hoses 16 remain untwisted when filter plates 8 are shifted between an open position and a closed position.

The connection between coupling means 13 and 13 is accomplished by flexible pressure hoses 16 connected to metallic joints 17 which are resistant to breaking or cracking even when the filter plates are brought into a closed position, as a result of which flexible pressure hoses 16 are prevented from being bent and cracked when the filter plates are brought into a close position. However, instead of the joints 17, metal joints in the form of U-shaped pipes may be used for interconnecting the coupling means.

Each water supply pipe 12 may be disposed between the bottom end of filter plate 8 and lower roller 9 in a manner to spray pressurized water to each filter cloth 10 from inside thereof, rather than disposed below the lower roller 9. Further, while coupling means 13 of neighboring filter plates 8 are connected to each other by means of flexible pressure hoses 16 in the embodiment shown, alternate coupling means may be connected in series for flow of washing water.

One communication port in coupling means 13 attached to the filter plate 8 adjacent to a fixed frame 18 of the filter press is connected to a supply pipe 19 rigidly secured to fixed frame 18. Likewise one communication port in coupling means 13 attached to filter plate 8 adjacent to a movable frame 20 is sealingly closed with a plug (not shown).

After the filter plates have been shifted to

an open position and cake has been removed from respective filter cloths 10, if pressurized water is fed to supply pipe 19, then the washing water will be distributed by way of flexible pressure hoses 16 to water supply pipes 12, and from spraying nozzles 11 to the surfaces of respective filter cloths 10, to thereby wash the filter cloths. At this juncture, each filter cloth 10 trained about the lower roller 9 is caused to travel therealong, so that it is washed over its entire filtering surface uniformly.

With the filter cloth washing device according to the present invention, even in the event of the number of filter plates being increased, the water for washing the increased number of filter cloths may be supplied easily and positively by increasing the number of pressure hoses. Since these hoses are of the same length and type, there is no need to prepare a variety of pressure hoses differing in length and type as in the prior art device, resulting in compactness in size of the device, and thus affording an increased maintenance space in the side portion of the filter press. This filter cloth washing device is easily adaptable for existing filter presses with less cost, and so, finds practicality for industrial purposes.

WHAT WE CLAIM IS:-

1. A filter press comprising a plurality of filter plates, a respective movable filter cloth associated with each filter plate and trained about a respective roller positioned below its respective filter plate and a device for washing the filter cloths, which device comprises a plurality of washing water supply pipes, each pipe being associated with a respective filter cloth, having a plurality of spraying nozzles and running in parallel to the roller about which the associated filter cloth is trained, a plurality of coupling means each connected to one end of a respective one of said water supply pipes, each of said coupling means having an inner diameter larger than the inner diameter of its respective water supply pipe and first and second communication ports, and either all the coupling means being connected in series for flow of washing water or alternate coupling means being connected in series for flow of washing water, each connection between two coupling means comprising two flexible pressure pipes interconnected by a metallic joint, and the arrangement being such that each coupling means which is connected to an upstream and a downstream coupling means has one of its communication ports connected by way of two said flexible pressure hoses connected together by a said metallic joint to one of the communication ports in the upstream coupling means and its other communication port connected by way of another two said flexible pressure

hoses connected through another said metallic joint to a communication port in the downstream coupling means.

2. A filter press as defined in claim 1, wherein the metallic joint is a U-shaped pipe.

3. A filter press as defined in claim 1, wherein each of said plurality of water supply pipes is provided between the bottom end of the respective filter plate and the respective lower roller.

4. A filter press as defined in claim 1, wherein alternate coupling means connected in series for flow of washing water.

5. A filter press including a filter cloth washing device substantially as herebefore described with reference to the accompanying drawings.

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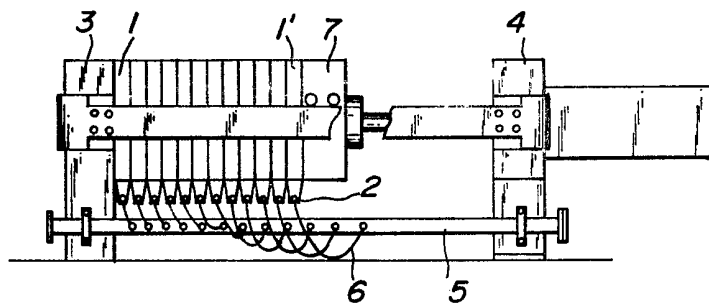
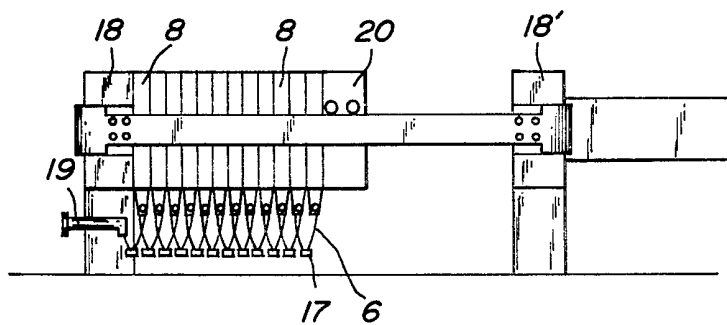
FIG.1**FIG.2**

FIG. 3

