



(12) **United States Patent**  
**Saito**

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(54) **EXTERNAL DEVICE FOR CLEANING  
FILTRATION MATERIAL AND ADAPTED  
FOR APPLICATION TO FILTRATION  
DEVICE**

(58) **Field of Classification Search**  
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B01D 24/4631; B01D 24/4636; B01D  
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See application file for complete search history.

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(56) **References Cited**

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U.S. PATENT DOCUMENTS

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3,333,694 A \* 8/1967 Range ..... B01D 24/205  
210/189  
4,482,457 A 11/1984 Jacquet  
(Continued)

(\* ) Notice: Subject to any disclaimer, the term of this  
patent is extended or adjusted under 35  
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FOREIGN PATENT DOCUMENTS

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CN 1615170 5/2005  
DE 539 266 C 11/1931  
(Continued)

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OTHER PUBLICATIONS

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**Related U.S. Application Data**

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(57) **ABSTRACT**

(30) **Foreign Application Priority Data**

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An external device for cleaning a filtration material is applied  
to a filtration device for filtering a supplied unfiltered liquid  
by layers of a filtration material to remove muddiness in the  
liquid and discharging the cleaned liquid to the outside. The  
cleaning device has an upstanding outer tube, a screw con-  
veyor rotatably placed in the outer tube and transferring the  
filtration material upward from the lower rod to the upper end  
of the outer tube while rub-washing the filtration material, a  
drive section for rotationally driving the screw conveyor, a  
control section for controlling rotation of the drive section,  
and a discharge tube for discharging the filtration material  
having been rub-washed, into a filtration container from the  
inside of the outer tube and an introduction tube that intro-  
duces the filtration material into the outer tube.

(51) **Int. Cl.**  
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(52) **U.S. Cl.**  
CPC ..... **B01D 24/4689** (2013.01); **B01D 24/14**  
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**4 Claims, 7 Drawing Sheets**

