



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
**14.04.2004 Bulletin 2004/16**

(51) Int Cl.7: **A47L 23/26**

(21) Application number: **03466016.7**

(22) Date of filing: **29.09.2003**

(84) Designated Contracting States:  
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR  
HU IE IT LI LU MC NL PT RO SE SI SK TR**  
Designated Extension States:  
**AL LT LV MK**

(71) Applicant: **Ing. Petr Gross, s.r.o.**  
**Milotice nad Becnou - 753 67 (CZ)**

(72) Inventor: **Gross, Petr**  
**Vrbno pod Pradedem, PSC : 793 26 (CZ)**

(30) Priority: **01.10.2002 CZ 200213522 U**

(74) Representative: **Janik, Zdenek**  
**Bulharska 1418**  
**708 00 Ostrava-Poruba (CZ)**

(54) **Device for cleaning shoe soles**

(57) Cleaning is done by movable cleaning parts (2) carried by at least two continuous belts (4,4'). Adjacent continuous belts (4,4') are moveable one to each other in a opposite directions. Each continuous belt (4,4') is taken in contact with a driving wheel (7) and a supporting wheel (5). The wheels (5,7) are placed on parallel shafts (6,6'). Driving wheels (7) pertaining to the continuous belts (4) running in the first direction are firmly fitted to the second shaft (6') and the driving wheels (7) pertaining

ing to the continuous belts (4') moving in the opposite direction are connected to the first shaft (6). All the supporting wheels (5) are loosely rotating on the respective shafts (6,6'). To provide for different sense of rotation of the shafts (6,6'), the shafts (6,6') have toothed wheels (8,8') fitted at the ends. Toothed wheels (8,8') are in mesh with opposite sides (11,12) of a two-sided toothed belt (9), which is also connected to the drive (10). The inner space (13) of the body (1) of the cleaner is sucked up via a filter (16),

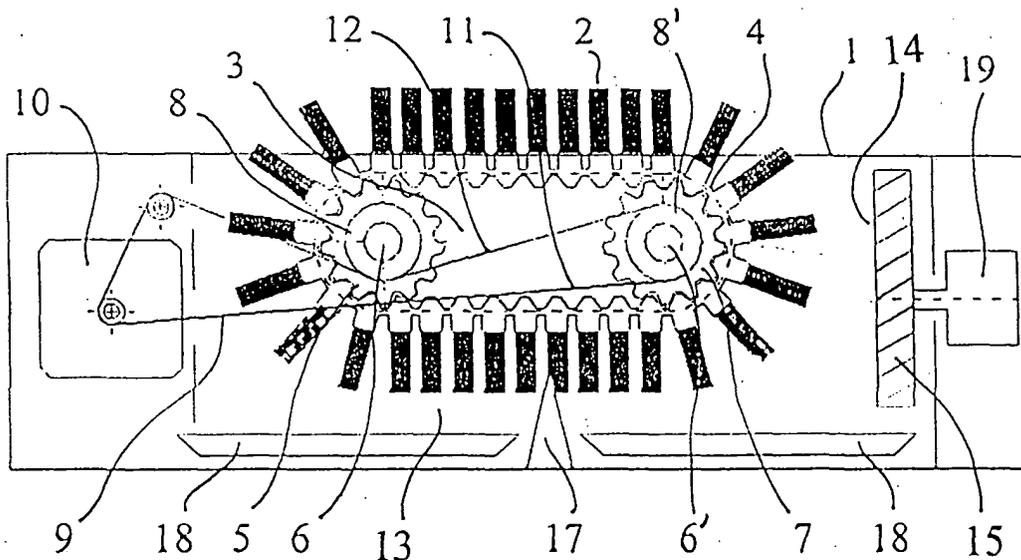


Fig. 1

## Description

**[0001]** The invention relates to device for cleaning dirty shoe soles, using a dry method of cleaning. The device can be positioned at the entrance of rooms and areas, where the depositing of dirt from outside is undesirable, such as residential dwellings, offices, doctors' surgeries, hospitals, business premises, shopping areas, schools, communal areas, historical buildings, industrial premises, etc.

**[0002]** It is general custom at present, where the bringing of outside dirt into the interior of a building is undesirable, to provide doormats composed either of rigid, brush-like bristles or a series of rigid strips, running either parallel to each other or organized into a pattern. This are made from various materials, the commonly used being rubber, metal or plastic. The drawback of using a doormat consists chiefly in insufficient contact between shoe and doormat, while walking across the doormat. People in a hurry or unconcerned about wiping their feet bring the dirt on their shoes in.

Further known devices for cleaning shoe soles incorporate moveable parts, which have the function to dislodge and remove dirt from the shoe soles. From EP 1 066 790 we have a device with cleaning parts located on a revolving shaft, which in addition performs a horizontal to and fro movement, whereas the CZ 29805 patent and the FR 74 02967 document describe devices in which the cleaning parts are fitted on continuous side by side placed belts, all moving in the same direction. The dirt remaining on the cleaning parts of the above described devices, unless accidentally dropping into the space below cannot be removed and is therefore re-circulated with each subsequent use. DE 101 29 435 A1 has produced a device where the cleaning parts, fitted on parallel equidistant running belts, rub against an inside bar. Even this device does not prevent the dirt, particularly dry power, from being dispersed into the surrounding area.

Also known are devices, where the cleaning parts are washed before each use. RU 2096017 produced a device with parallel runnings belts, whose cleaning equipment passes through a liquid bath located in the lower part of the device. Downside of this is a wet shoe sole liable to slip accidentally and thus being potentially dangerous. From US 6,406,549 B1 is known a device with parallel running belts, the cleaning parts of which pass through first washing unit and then a drying unit. CZ PV 1069-92 produced a device where following a wet unit, equipped with special in disinfectant saturated belts, moving between the grid in an alternating fashion, is situated a dry unit for the drying of the lower part of the shoes. A common disadvantage of all devices, using liquid washing as part of their operation, is the complexity of the apparatus and hence the high price of the device. There is further the need to connect the apparatus to a water supply and discharge pipes. For the reason mentioned, the device are mostly build into the floor and pre-

dominantly located only in places busy with people.

A common downside of all devices, where the cleaning parts are moving in one direction only, is the limited speed of the parts, in order not to push the shoe being cleaned away from the cleaning area. This results in insufficient cleaning of the shoes. The cleaning of grooved surfaces on these devices is also not performed thoroughly.

**[0003]** The above mentioned disadvantages are solved by a device for cleaning the shoe soles, in which the body of the cleaner houses a mechanism for ensuring a shifting motion of the cleaning parts and where the cleaning parts are fitted on at least two side by side placed continuous belts. Continuous belts are in contact with supporting wheels and driving wheels and both wheels belonging to the same continuous belt are placed on shafts parallel to each other. The basis of invention is, that at least two continuous belts are moveable, one to each other, in a opposite directions and each continuous belt for the first direction of movement has the driving wheel, firmly fitted to the second shaft and the supporting wheel, loosely rotating on the first shaft, and each continuous belt for the second direction of movement has the driving wheel firmly fitted to the first shaft and the supporting wheel, loosely rotating on the second shaft. The first shaft is equipped with the first toothed wheel, which is in contact with the teeth on the first side of two-sided toothed belt and the second shaft is equipped with the second toothed wheel, which is in contact with the teeth of the second side of two-sided toothed belt. The two-sided toothed belt is connected to the drive unit. Inner space of the body of the cleaner is connected to the opening of suction apparatus, which consists of ventilator and filter.

The advantage of this device is that the power generated by the motion of the cleaning parts in one direction is compensated by the force generated by the cleaning parts moving in the opposite direction and the shoe being cleaned is not, even under high speed friction, pulled away from its position. A further advantage of the two-way system is that by slightly altering the position of shoe to belt, even a highly textured shoe sole with deep cut grooves can be thoroughly cleaned. The advantage of using a two sided toothed belt for a two way system considerably simplifies the manufacture of this device, reduces the noise level and ensures reliability in an even highly polluted environment. There is no need to connect the apparatus too a watersupply or discharge pipes and devices is not depend on suitably constructed floor space. A further advantage, which has to do with the built in suction mechanism, is that the inner area of the device is being kept free of circulating dust despite the dry cleaning parts moving in opposite direction to each other. The device can be constructed as fully portable and can be used in less or highly frequented areas and positioned in close proximity to the space required to be kept clean.

**[0004]** Particular embodiment of the invention will

now be described with reference to the accompanying drawing in which:

Figure 1. is a lateral view of inner arrangement of the device for cleaning shoe soles as it is seen in cross section A-A in Figure 3.

Figure 2 is a view of one of the shafts with the supporting and driving wheels and Figure 3 is a plan view of the device.

**[0005]** Device for cleaning shoe soles consists of a body 1 of the cleaner, of which cleaning parts 2, brushes, in this particular example, are protruding on the upper side, and of mechanism 3 to provide for the cleaning parts 2 shifting motion. The cleaning parts 2 are located on side by side placed six continuous belts 4,4'. The adjacent continuous belts 4,4' move in the direction opposite to each other. Each continuous belt 4,4' is taken in contact with the supporting wheel 5 and the driving wheel 7. Wheels 5,7 pertaining to the same continuous belt 4,4' are fitted on shafts 6,6' in parallel each to other. The driving wheel 7 of the continuous belt 4 dedicated for the first direction of motion is connected to the second shaft 6', while the supporting wheel 5 is rotating on the first shaft 6. The driving wheel 7 of the continuous belt 4' dedicated for the second direction of motion is connected to the first shaft 6, while the respective supporting wheel 5 is rotating on the second shaft 6'. The first shaft 6 has got a first toothed wheel 8, fitted at one end. First toothed wheel 8 is in mesh with the second side 12 of a two-sided toothed belt 9. Second shaft 6' has got a second toothed wheel 8' fitted at the end. Second toothed wheel 8' is in mesh with the first side 12 of the two-sided toothed belt 9. The two-sided toothed belt 9 is connected to the drive 10. Below the continuous belts 4,4' there are collecting trays 18, between which a mechanical partition 17 is located. The inner space 13 of the body 1 of the cleaner is connected to the opening 14 of suction apparatus, which consist of ventilator 15 located inside the body 1 of the cleaner and driven by a motor 19, and a filter 16 connected to the ventilator 15 outlet. Filter 16 is located outside the body 1 of the cleaner.

**[0006]** The device for cleaning shoe soles having been switched on, the shafts 6,6', driving wheels 7 connected to them included, rotate in mutually opposite sense. As the driving wheels 7 of adjacent continuous belts 4,4' are connected to different shafts 6,6', the adjacent belts 4,4' will shift in mutually opposite directions. Coarse dirt is removed from the cleaning parts 2 by scrubbing the same against the mechanical partition 17 and falls down in the dirt collecting trays 18, from which it should be removed periodically. Airborne dirt is exhausted from the inner space 13 of the body 1 by the fan 15 and trapped in the filter 16.

**[0007]** The invention may also be applied to tyre cleaning, for example, prior to the treatment of a car in a carwash or before a tyre is taken apart from the wheel,

or to other objects with textured surface.

## Claims

1. A device for cleaning the shoe soles, in which the body (1) of the cleaner houses a mechanism (3) for ensuring a shifting motion of the cleaning parts (2) and where the cleaning parts (2) are fitted on at least two side by side placed continuous belts (4,4') and continuous belts (4,4') are in contact with supporting wheels (5) and a driving wheels (7) and both wheels (5,7) belonging to the same continuous belt (4,4') are placed on shafts (6,6') parallel to each other, **characterised in that** at least two continuous belts (4,4') are moveable one to each other in a opposite directions and each continuous belt (4) for the first direction of movement has the driving wheel (7), firmly fitted to the second shaft (6'), and the supporting wheel (5), loosely rotating on the first shaft (6), and each continuous belt (4') for the second direction of movement has the driving wheel (7) firmly fitted to the first shaft (6) and the supporting wheel (5) loosely rotating on the second shaft (6'), and the first shaft (6) is equipped with the first toothed wheel (8), which is in contact with the teeth on the first side (12) of two-sided toothed belt (9), and the second shaft (6') is equipped with the second toothed wheel (8'), which is in contact with the teeth of the second side (11) of two-sided toothed belt (9) and the two-sided toothed belt (9) is connected to the drive unit (10), and the inner space (13) of the body (1) of the cleaner is connected to the opening (14) of suction apparatus, which consists of ventilator (15) and filter (16).

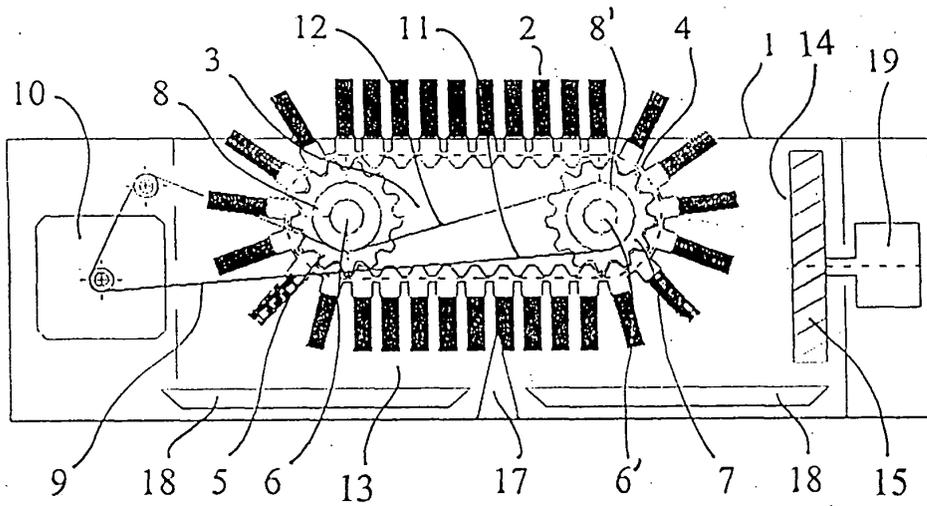


Fig. 1

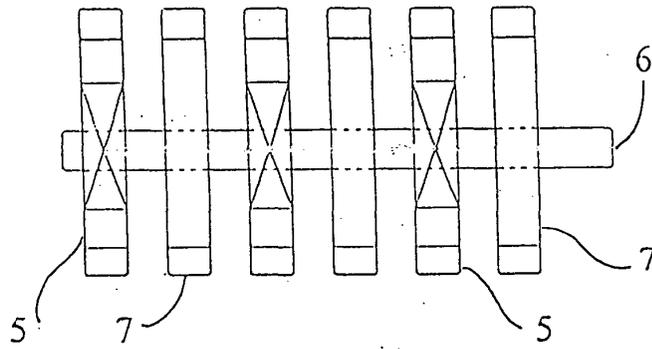


Fig. 2

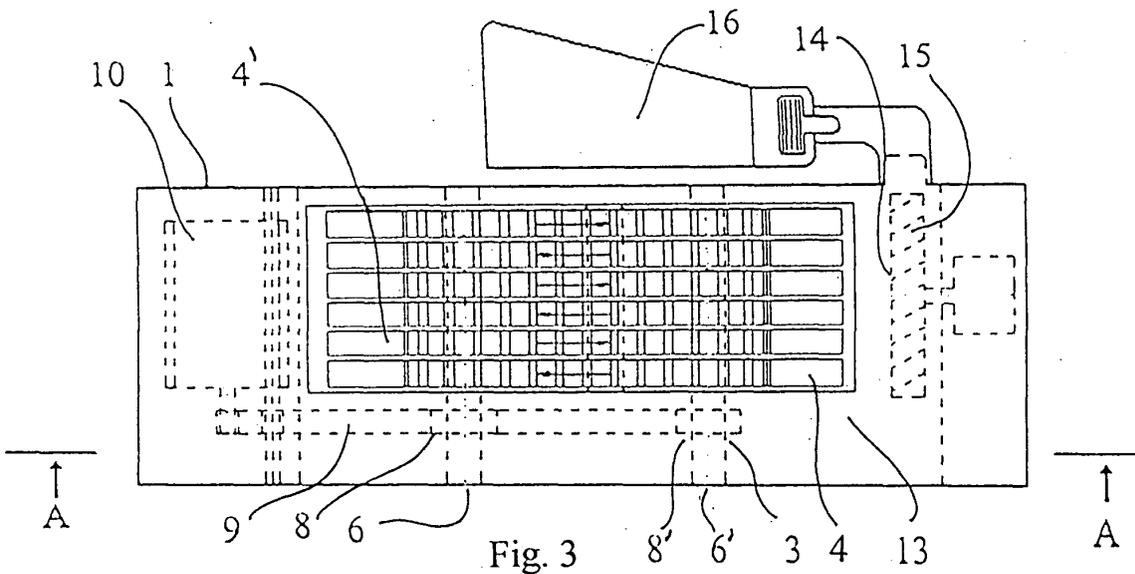


Fig. 3



European Patent  
Office

EUROPEAN SEARCH REPORT

Application Number  
EP 03 46 6016

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
Y	DE 20 39 069 A (ALVERU SA) 17 February 1972 (1972-02-17) * page 4, paragraph 1 - page 6, paragraph 1; figures 1,4 *	1	A47L23/26
Y	DE 44 47 498 A (GEBAUER THORSTEN J L) 30 May 1996 (1996-05-30) * column 1, line 64 - column 3, line 50; figures 1,3,5,7 *	1	
Y	FR 2 452 909 A (BOUCHARD AUBETERRE HUBERT DE) 31 October 1980 (1980-10-31) * page 3, line 18 - line 20; figures *	1	
Y	US 6 067 688 A (WEST WILLIAM E) 30 May 2000 (2000-05-30) * column 4, line 55 - column 5, line 16; figures 1,2 *	1	
Y	US 5 991 967 A (WILLIAMS BENNIE E) 30 November 1999 (1999-11-30) * column 2, line 16 - line 27; figure 2 *	1	TECHNICAL FIELDS SEARCHED (Int.Cl.7)
A	DE 198 47 506 A (ROVEMA GMBH) 20 April 2000 (2000-04-20) * figure 2 *	1	A47L
The present search report has been drawn up for all claims			
Place of search MUNICH		Date of completion of the search 11 February 2004	Examiner Lodato, A
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 03 46 6016

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on the European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

11-02-2004

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
DE 2039069	A	17-02-1972	DE 2039069 A1	17-02-1972
DE 4447498	A	30-05-1996	DE 4441637 A1	30-05-1996
			DE 4447498 A1	30-05-1996
			DE 9421724 U1	26-09-1996
FR 2452909	A	31-10-1980	FR 2452909 A1	31-10-1980
US 6067688	A	30-05-2000	NONE	
US 5991967	A	30-11-1999	NONE	
DE 19847506	A	20-04-2000	DE 19847506 A1	20-04-2000