(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 4 310 253 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
24.01.2024 Bulletin 2024/04

(21) Application number: **22188805.0**

(22) Date of filing: **04.08.2022**

(51) International Patent Classification (IPC):
E01F 8/00 *(2006.01)* ***E01F 8/02*** *(2006.01)*

(52) Cooperative Patent Classification (CPC):
E01F 8/00; E01F 8/0029; E01F 8/007; E01F 8/02

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

(30) Priority: **22.07.2022 TR 202211688**

(71) Applicant: **Hatko Kaucuk Anonim Sirketi**
Iskenderun Hatay (TR)

(72) Inventor: **HATKO, Nejan**
Hatay (TR)

(74) Representative: **Sevinç, Cenk**
Grup Ofis Marka Patent A.S.
Atatürk Bulvari, 211/11
Kavaklidere
06680 Ankara (TR)

(54) **SOUND BARRIER**

(57) The present invention relates to a sound barrier, which is an acoustic barrier that prevents environmental noise from motor vehicles, rail systems or ventilation units from spreading into the city and reaching people in the building, to be built around the facility or unit at points such as roads or railways, cooling units, industrial facilities, or entertainment venues. The sound barrier of the present invention comprises 5-45 mm single row Q188 steel mesh (1), 5-35 mm wipe iron (3) and 15-45 mm wipe iron (2), Styrene Butadiene Rubber (SBR) granules obtained from the recycling of 1-9 mm end-of-life tires (ELT), binder, water, accelerator, and fire retardant.

EP 4 310 253 A1

Description

Technical Field of the Invention

[0001] The present invention relates to a sound barrier, which is an acoustic barrier that prevents environmental noise originating from roads, railways, airlines, entertainment venues, construction sites or industrial facilities from spreading into the city and reaching people living in a building, to be built around the facility or unit at points such as roads or railways, cooling units, industrial facilities or entertainment venues.

State of the Art

[0002] Environmental pollution is one of the most important problems of our time, and different countries seek solutions to these problems at the international level. Although noise pollution, which is one of the environmental pollutions, does not have a permanent effect on the environment, it has been determined that there are negative effects on human health in terms of physical, physiological, psychological and performance. Considering the fact that loud noise and noise can leave a lasting effect in a very short time, noise takes its place in the legislation as a source of pollution that requires taking measures. Noise is expressed as harmful tones that negatively affect the life and human health, and other living beings. Noise pollution, in other words, the problem of sound pollution, has become one of the most important environmental problems of today especially with the development of industry and technology, population growth, and urbanization. Among the factors that cause noise pollution, there are car alarms especially during rest hours, emergency sirens, the noise of various white goods and household appliances, factory-machine sounds, construction and repair works, noise-making animals, sound systems, speakers, matches, entertainment, religious-social activities, and traffic sounds. Universally, the most common type of noise originates from transportation systems. In addition to motor vehicles, the noise created by aircraft and railway vehicles also has an important place. Making mistakes in city planning may cause industrial and residential areas to converge, and as a result, the noise pollution created by the industrial area creates negative effects on the health of the people living in the neighboring settlements. The effects of sound on people and the environment are shown in Table 1 [1].

Table1. Levels of human and environmental effects of some sound sources

Effect on humans	sound level in dB(A)	Source of sound
Very harmful	140	Jet engine
	130	Ball peen hammer
	120	Propeller plane
Harmful	110	Rock drill
	100	Chain saw
	90	Heavy truck
Hazardous	80	Street with heavy traffic
Conceals the conversation	70	Passenger car
Disturbing	60	Normal speech
	50	speak below one's breath
	40	Little radio music
	30	Whispering
	20	Quiet apartment in the city
	10	rustling leaves
	0	Threshold of hearing

[0003] In order to provide a solution to the above-mentioned problem, acoustic barriers are utilized between the sound source and the receiver to prevent noise pollution. Acoustic barriers are also called noise barrier, sound wall, sound shoulder, sound barrier, acoustic barrier, sound pitch, and environmental barriers. Noise barriers are exterior construction elements designed to protect residential areas against noise pollution. Acoustic barriers have many different uses such

as airports, factories, construction sites, ventilation units, residences, vehicles, etc. These acoustic barriers, which are used in different geometries from different materials, act as an obstacle when the sound pressure level at the noise source reaches the receiving point and reduces the level of exposure to noise at this point. Sound waves from the noise source propagate 360°. During this propagation, some of the sound waves move directly towards the noise-canceling barrier, while others circulate over the noise barrier. A part of the sound wave hitting the noise barrier is absorbed by the barrier, some part of them hit the wall and return, that is, they are reflected, and some part of them pass through the barrier by losing its power. The sound waves that go around the barrier are diffracted many times as they pass over the barrier, and as a result, it is dispersed. The sound waves that diffract and disperse lose their strength by being affected by the friction in the air, the wind, and the humidity. Therefore, the noise wall extends the distance that the sound waves will take, allowing the strength of the sound waves to be reduced. Thus, the sound intensity reaching the residential areas is reduced to reasonable values [2].

[0004] There are many types of sound barriers among noise barriers. These can be classified as earth berm, wooden barriers, aluminum barriers, concrete barriers, plastic-PVC-fiberglass barriers, transparent barriers, biological barriers, etc. Earth berm are earthen structures and can be integrated with the landscape. Compared to vertical barriers, they occupy more space and require a higher structure. Although wooden barriers can be made absorbent with innovations, they have a natural appearance. Aluminum barriers have the appearance of metal walls. They are formed by placing the panels side by side. Some part of the sound is absorbed by the materials inside the panels. Concrete barriers are reflective structures. They have a long-lasting structure. Plastic barriers are similar in appearance to aluminum barriers and have a lighter structure than other barriers. The transparent barrier is produced from polycarbonate or acrylic material. Since it is transparent, it does not block the view for drivers. However, it usually has a reflective surface. Biological barriers have a structure integrated with plants. However, the maintenance cost thereof is very high.

[0005] Another major cause of environmental pollution is waste materials thrown into the environment. One of the most important of these waste materials is vehicle tires that have completed their service life. End of Life Tires (ELT) cause uncontrolled fires. Due to the high oil content of these tires, fires originating from tires persist for months and emit large amounts of harmful compounds into the atmosphere. Fires originating from tires cause air, soil, and water pollution. In addition, since waste tires contain water after rain, they create an environment suitable for mosquitoes to live and multiply, and mosquito pests breeding in tire piles cause the spread of infectious epidemics [4]. Vehicle tires are produced from styrene butadiene rubber. Compounds such as zinc oxide and lead oxide are used in the vulcanization process of rubber. These chemical materials can poison living beings by mixing with the soil, streams and water bodies in the form of a liquid waste. The rate of waste material generated in the rubber processing process is approximately twenty-five times that of the rubber produced [5]. Since rubber causes permanent damage to the environment both during production and after its life, the use of these materials should be minimized.

[0006] The CN207159852U utility model application, which is in the state of the art, relates to a sound barrier, especially a road sound barrier. A road sound barrier includes a concrete guardrail, a plurality of upright columns disposed above the concrete guardrail, and a suction sound insulation board disposed between the upright columns, wherein the sound absorption and sound insulation panels comprise acoustical panels arranged in sequence from inside the building. The production cost is quite high since said utility model includes a concrete guardrail and a large number of upright columns disposed on the guardrail.

[0007] The CN210216199U utility model application, which is in the state of the art, relates to the technical field of sound absorption panels, in particular to a composite sound absorption panel. The utility model relates to a composite acoustic panel characterized by comprising an aluminum foam layer, a first plastic material layer, a honeycomb aluminum layer, a second plastic material layer, and an ordinary aluminum layer. The first plastic material layer is above the foam aluminum layer, the honeycomb aluminum layer is above the first plastic material layer; the second plastic material layer is above the honeycomb aluminum layer, the ordinary aluminum layer is above the second plastic material layer. The use of foam aluminum material here increases the production cost and causes environmental pollution.

[0008] It is necessitated to make a development in the relevant field due to disadvantages such as the inadequacies in the sound barriers, the raw materials used in the production of these barriers cause environmental pollution and the high production costs in the state of the art.

Brief Description and Objects of the Invention

[0009] The present invention discloses a sound barrier made of granule pieces of Styrene Butadiene Rubber (SBR) to be used in order to prevent the environmental noise caused by motor vehicles, rail systems or ventilation units from spreading into the city and reaching people in the building. The sound barrier of the present invention comprises 5-45 mm single row Q188 steel mesh (1), 5-35 mm wipe iron (3) and 15-45 mm wipe iron (2), Styrene Butadiene Rubber (SBR) granules obtained from the recycling of 1-9 mm end-of-life tires (ELT), binder, water, accelerator, and fire retardant.

[0010] The most important object of the present invention is to prevent the noise generated by vehicles moving in highway, railways or urban traffic from receiving residences, workplaces, etc. in the city. The surface formed by combining

rubber granule parts, which is the basic building block of the sound barrier of the present invention, has a porous structure. The sound barrier prevents the reflection of some of the sound waves from noise sources by means of its porous structure and synthetic grass used on the barrier surface, and also, prevents the transmission of sound since it has a mass of more than 20 kg/m^2. Thus, it increases the quality of life in people's homes, workplaces, etc., and provides a peaceful environment for people by preventing noise from noise sources such as cars, trucks, trains, ventilation units. In addition, the sound barrier of the present invention strengthens the insulation by reflecting some of it as well as absorbing the sound by means of the materials used in its structure.

[0011] Another object of the present invention is to ensure the recycling of expired tires in order not to cause environmental pollution. The sound barrier of the present invention is produced with Styrene Butadiene Rubber (SBR) granule pieces obtained from the recycling of end-of-life tires (ELT). These rubber granules are combined with chemical adhesives and converted into a rectangular mold by using heat treatment with the help of a press. By means of the use of end-of-life tires in the sound barrier, these tires are recycled, and environmental pollution is prevented.

[0012] Another object of the present invention is to provide a low cost sound barrier. The sound barrier of the present invention is produced with Styrene Butadiene Rubber (SBR) granule pieces obtained from the recycling of end-of-life tires (ELT). Thus, there is no need for Styrene Butadiene Rubber (SBR) production, and the production of sound barriers takes place at low costs since already existing rubbers are used.

[0013] Another object of the present invention is to provide a structure that both eliminates noise pollution and adds visual aesthetics to the areas where it is used. Grass is mounted on the sound barrier of the present invention. Thus, an aesthetic appearance is given to the sound barrier.

[0014] Another object of the present invention is to minimize the maintenance cost, which is very high in all other barriers, and to ensure that it does not cause any pollution to the environment since it is used as a noise barrier again by breaking down after the end of its life.

[0015] By means of the present invention, a sound barrier with high chemical resistance and good insulation is provided, that prevents environmental noise from motor vehicles, rail systems or ventilation units from spreading into the city and reaching people in the building, and that is an acoustic barrier to be constructed at points such as near roads, railways, or ventilation units.

Description of the Figures

[0016]

Figure 1 is the grid plan view of the sound barrier.

Figure 2 is the sea wave plan view of the sound barrier.

Figure 3 is the grid sectional view of the sound barrier.

Figure 4 is the sea wave sectional view of the sound barrier.

Description of the References Included in Figures

[0017]

1. Single row Q188 steel mesh
2. 15-45 mm wipe iron
3. 5-35 mm wipe iron

Detailed Description of the Invention

[0018] The invention relates to a sound barrier made of Styrene Butadiene Rubber (SBR) granule parts, which is an acoustic barrier to be built on the roadsides at points such as highway and railway ventilation units, that prevents environmental noise from spreading into the city or reaching people in the building, and that is obtained from the recycling of end-of-life tires (ELT).

[0019] The sound barrier of the invention comprises, compared to the final product, 3.5-3.7 kg of 5-45 mm single row Q188 steel mesh (1) by mass, 0,7-0,8 kg 5-35 mm wipe iron (3) by mass and 2.5-3 kg 15-45 mm wipe iron (2) by mass, 88-89% Styrene Butadiene Rubber (SBR) granules by mass, obtained from the recycling of 1-9 mm end-of-life tires (ELT), 4-4.2% binder by mass, 0.15-0.18% water by mass, 0.02-0.03% accelerator by mass and 0.6-07% fire retardant by mass. The surface formed by combining rubber granule parts, which is the basic building block of the sound barrier

of the present invention, has a porous structure. The sound barrier absorbs some of the sound waves emanating from noise sources by means of its porous structure, and in addition, it strengthens the isolation by reflecting some part of it. Thus, it increases the quality of life in people's homes, workplaces, etc., and provides a peaceful environment for people by preventing noise from noise sources such as cars, trucks, trains.

[0020] Isocyanate-based binder with high adhesion and cohesion resistance is used as a binder in the sound barrier of the present invention. During bonding, isocyanates eliminate the tendency of the layers containing high humidity to burst (vapor bubble formation) during hot pressing. Isocyanates can form bonds with 20% moisture chips without reducing resistance, thereby saving drying costs. A tris(1-chloro-2-propyl)phosphate (TCPP) based fire retardant is used as a fire retardant in the sound barrier. TCPP has low temperature resistance and is moisture resistant. In the present invention, a moisture-proof and fire-resistant sound barrier is provided by using a TCPP-based fire retardant. In addition, mono ethylene glycol (MEG) based accelerator is used as an accelerator in the sound barrier of the present invention.

[0021] The sound barrier of the present invention is produced with Styrene Butadiene Rubber (SBR) granule pieces obtained from the recycling of end-of-life tires (ELT). Production method of the sound barrier comprises the process steps of;

i. Weighing 88-89% by mass of Styrene Butadiene Rubber (SBR) granule parts obtained from the recycling of 1-9 mm end-of-life tires (ELT) with the help of a screw,
ii. transferring the prepared granules to the mixer of the machine to be produced,
iii. transferring 4%-4.3% by mass of binder, 0.15-0.18% by mass of water, 0.02-0.03% by mass of accelerator and 0.6-0.7% by mass of fire retardant to the mixer,
iv. mixing all the materials added to the mixer in the mixer for 5 minutes to form a homogeneous mixture,
v. transferring the prepared mixture to the molds without losing time and performing the performing gauging process to the mixture transferred to the molds,
vi. Disposing 5-45 mm single row Q188 steel mesh (1) at a rate of 3.5-3.7% by mass, 5-35 mm wipe iron (3) at a rate of 0.7-0.8% by mass, and 15-45 mm wipe iron (2) at a rate of 2.5-3% by mass, in the mold obtained after gauging,
vii. performing molding process in the specified time,
viii. mounting grass to the molded product,
ix. storing the obtained product after cooling.

[0022] The sound barrier is used in the desired thickness by combining multiple molds. In order to prevent abrasive effects such as stretching and strain due to external factors such as harsh weather conditions and to increase durability, 5-35 mm wipe iron (3) and 15-45 mm wipe iron (2) are added between each mold, and by rendering it into a sandwich form, the sound barrier is produced in a single piece. The sound barrier of the present invention not only absorbs the sound, but is also used for aesthetic purposes in areas where it will be positioned in forms such as wavy, square, oval or in the form of different numbers and letters. Visuality is strengthened by covering the inner and/or outer sides of the sound barriers, where cars, trains and the like face, with synthetic grass.

REFERENCES

[0023]

[1] Stansfeld, S. A., & Matheson, M. P. (2003). Noise pollution: non-auditory effects on health. British Medical Bulletin, 68(1), 243-257. https://doi.org/10.1093/bmb/ldg033

[2] Otokorkuluk, S. B.- Y. Y. M. (2019, December 1). SES bariyeri, Gürültü bariyeri - Yente Yapi Ankara. Otokorkuluk, Ses Bariyeri - Yente Yapi Makine. Retrieved May 30, 2022, from https://www.yente.com.tr/tr/ses-bariyeri

[3] Bariyeri, H. S. (2021, January 28). Akustik Bariyer Nedir ve Nerelerde Kullanilir? Hatko Ses Bariyeri. https://hatko-sesbariyeri.com/akustik-bariyer-nedir/#:%7E:text=G%C3%BCr%C3%BClt%C3%BCn%C3%BCn%20yay%C4%B1lmas%C4%B1n%C4%B1%20engelleyen%20bu%20engeller,i%C3%A7in%20bu %20%C3%BCr%C3%BCn-ler%20%C3%A7ok%20kullan%C4%B1%C5%9Fl%C4 %B1d%C4%B1r.

[4] Mersin Büyük[illegible]ehir Belediyesi. (2021). Ömrünü Tamamlami[illegible] Lastiklerin (ÖTL) Yönetimi. https://cevre.mersin.bel.tr/omrunu-tamamlamis-lastiklerin-otl-yonetimi/

[5] Briggs, B. H. (2015, April 17). Demand for rubber "threatens forests." BBC News. https://www.bbc.com/news/science-environment-32350985

Claims

1. A sound barrier, which is an acoustic barrier that prevents environmental noise from motor vehicles, rail systems or ventilation units from spreading into the city and reaching people in the building, **characterized by** comprising; compared to the final product, 3.5-3.7 kg 5-45 mm single row Q188 steel mesh (1) by mass, 0,7-0,8 kg 5-35 mm wipe iron (3) by mass and 2.5-3 kg 15-45 mm wipe iron (2) by mass, 88-89% Styrene Butadiene Rubber (SBR) granules by mass, obtained from the recycling of 1-9 mm end-of-life tires (ELT), 4-4.2% binder by mass, 0.15-0.18% water by mass, 0.02-0.03% accelerator by mass and 0.6-07% fire retardant by mass.

2. A sound barrier according to Claim 1, **characterized in that**, said binder is isocyanate based.

3. A sound barrier according to Claim 1, **characterized in that**, said accelerator is mono ethylene glycol (MEG) based.

4. A sound barrier according to Claim 1, **characterized in that**, said fire retardant is tris(1-chloro-2-propyl)phosphate (TCPP) based.

5. A production method of a sound barrier according to Claim 1, **characterized by** comprising the process steps of;

   i. Weighing 88-89% by mass of Styrene Butadiene Rubber (SBR) granule parts obtained from the recycling of 1-9 mm end-of-life tires (ELT) with the help of a screw,
   ii. transferring the prepared granules to the mixer of the machine to be produced,
   iii. transferring 4%-4.3% by mass of binder, 0.15-0.18% by mass of water, 0.02-0.03% by mass of accelerator and 0.6-0.7% by mass of fire retardant to the mixer,
   iv. mixing all the materials added to the mixer in the mixer for 5 minutes to form a homogeneous mixture,
   v. transferring the prepared mixture to the molds without losing time and performing the performing gauging process to the mixture transferred to the molds,
   vi. Disposing 5-45 mm single row Q188 steel mesh (1) at a rate of 3.5-3.7% by mass, 5-35 mm wipe iron (3) at a rate of 0.7-0.8% by mass, and 15-45 mm wipe iron (2) at a rate of 2.5-3% by mass, in the mold obtained after gauging,
   vii. performing molding process in the specified time,
   viii. mounting grass to the molded product,
   ix. storing the obtained product after cooling.

6. A sound barrier according to Claim 6, **characterized in that**, said binder is isocyanate based.

7. A sound barrier according to Claim 6, **characterized in that**, said accelerator is mono ethylene glycol (MEG) based.

8. A sound barrier according to Claim 6, **characterized in that**, said fire retardant is tris(1-chloro-2-propyl)phosphate (TCPP) based.

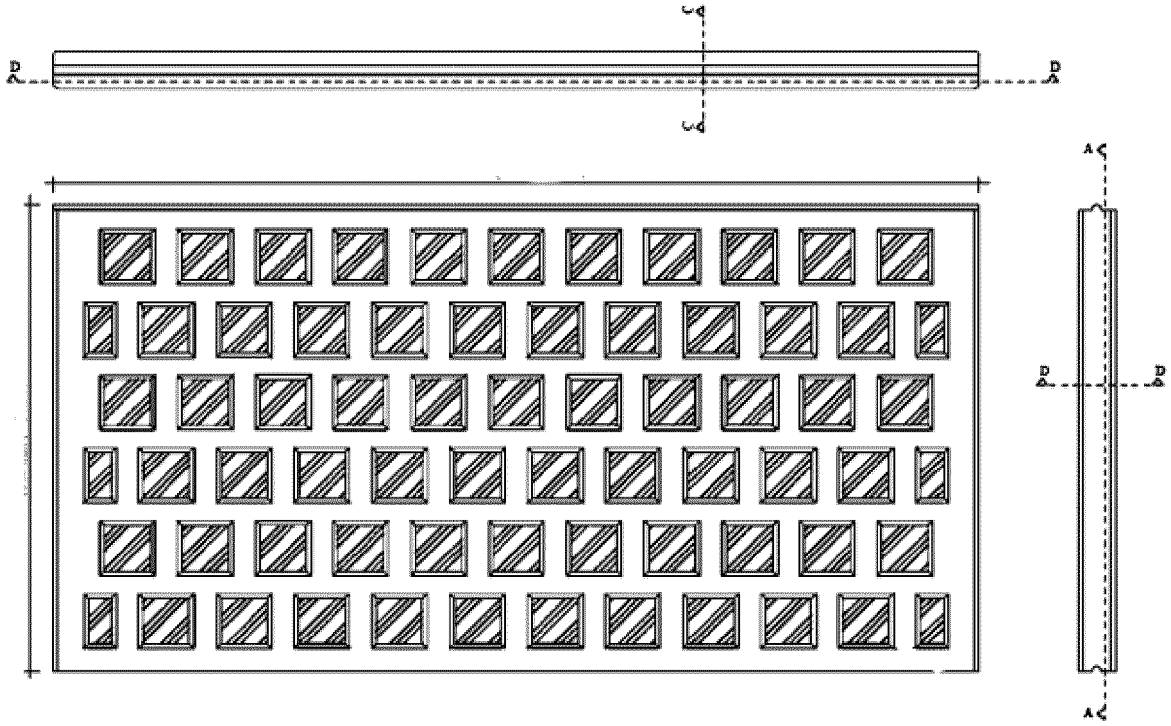

Figure 1

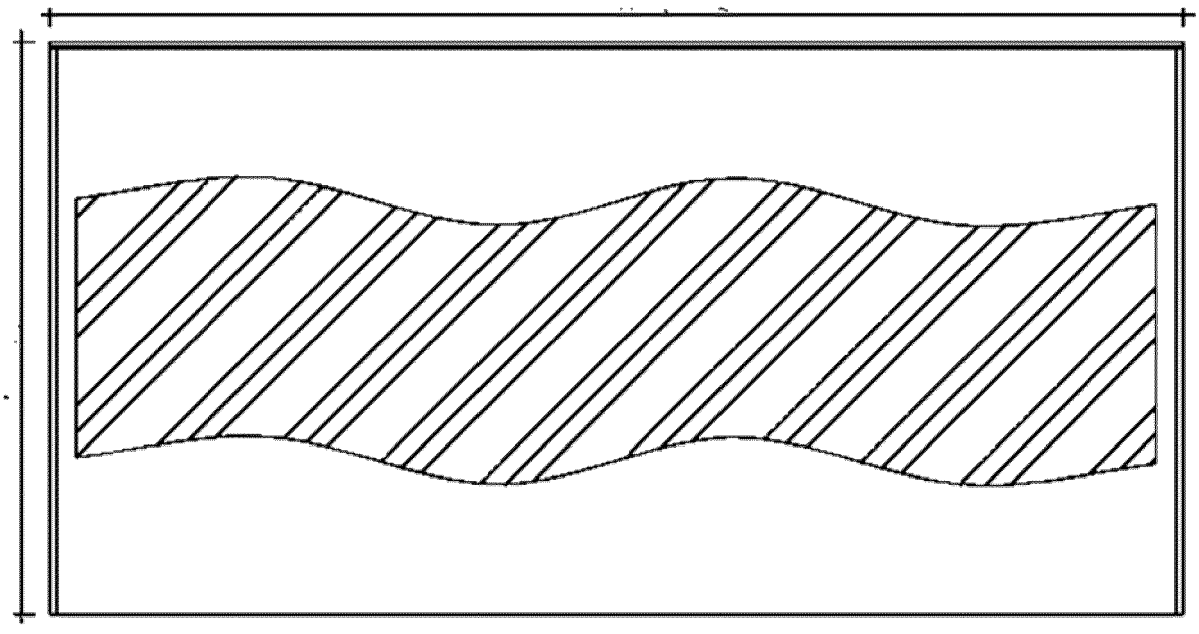

Figure 2

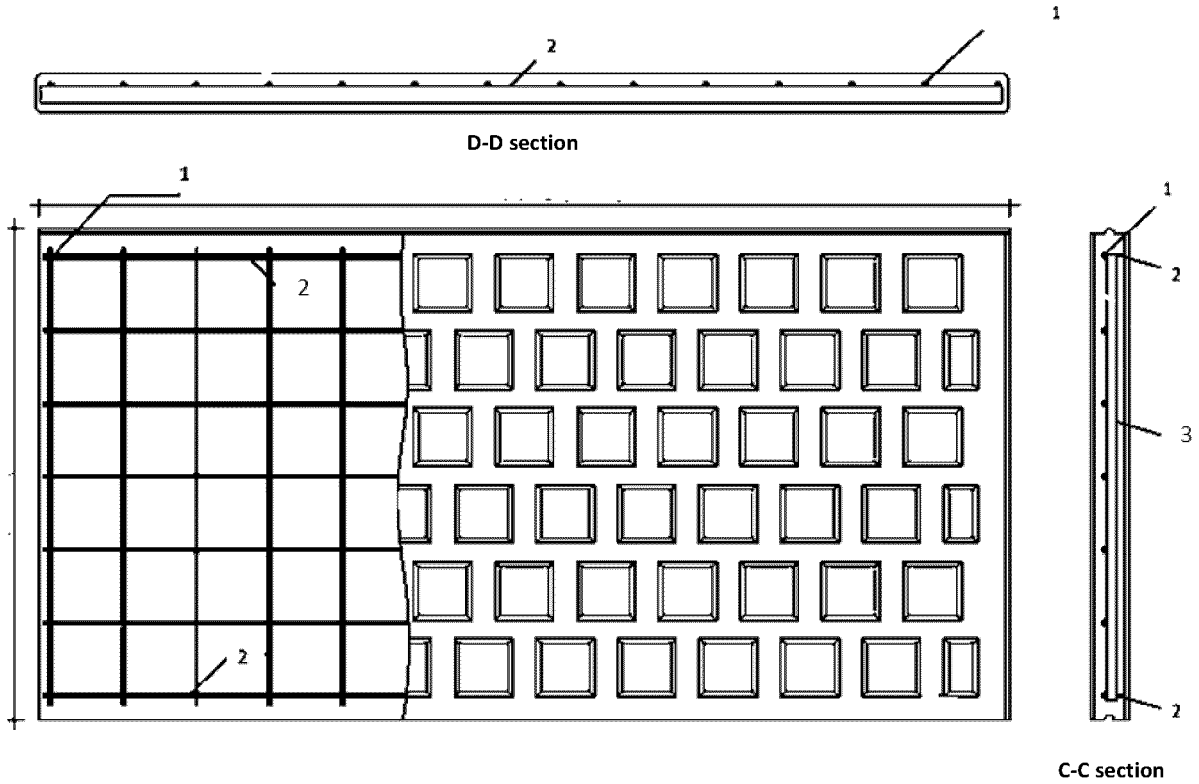

Figure 3

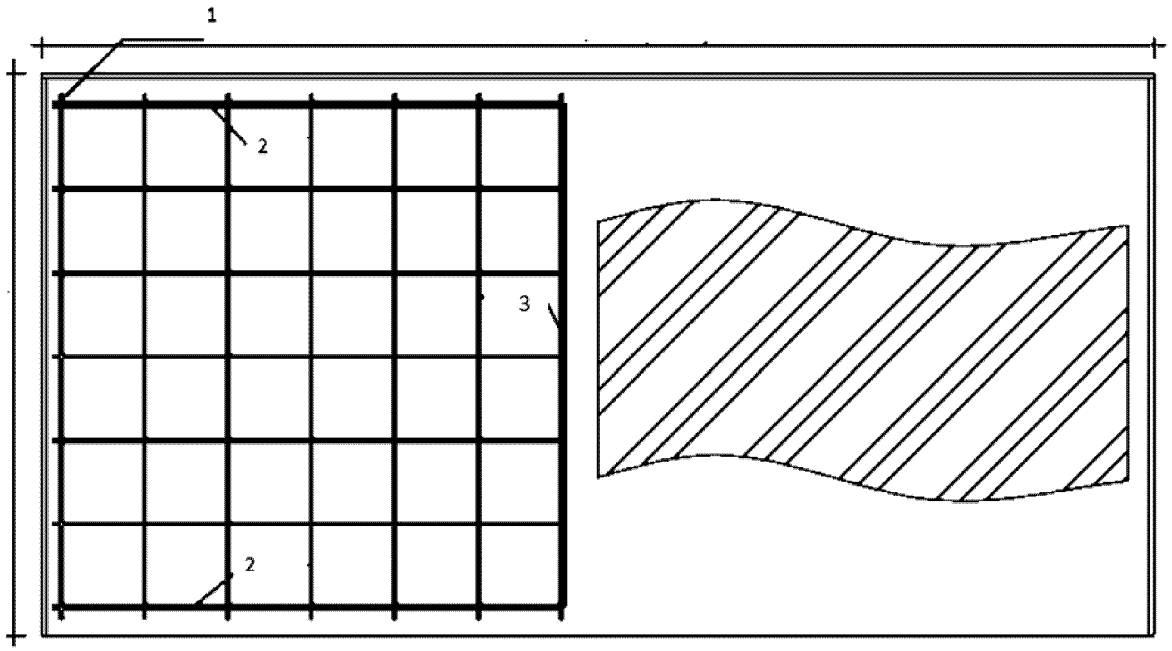

Figure 4

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 22 18 8805

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 2 374 769 A1 (BETONWERK SCHUSTER GMBH [DE]) 12 October 2011 (2011-10-12)	1-4	INV. E01F8/00
Y	* the whole document *	5-8	E01F8/02
X	WO 2018/024263 A1 (CZECH TECHNICAL UNIV IN PRAGUE [CZ]) 8 February 2018 (2018-02-08) * page 1, paragraph 1 * * page 8, paragraph 2 - page 9, paragraph 1; figures 3a, 3b *	1-4	
X	CN 106 801 387 A (POWERCHINA CHENGDU ENGINEERING CORP LTD) 6 June 2017 (2017-06-06)	1-4	
Y	* paragraph [0001] * * paragraph [0052] * * paragraph [0068]; figures 1-3 *	5-8	
X	CZ 35 436 U1 (INTERTECH PLUS S R O [CZ]) 27 September 2021 (2021-09-27)	1-4	
Y	* paragraph [0002] * * paragraph [0032] - paragraph [0042]; figures 1,2 *	5-8	
A	WO 2015/140584 A1 (LAKUSIC STJEPAN [HR]; BJEGOVIC DUBRAVKA [HR] ET AL.) 24 September 2015 (2015-09-24) * page 1, paragraph 1 * * page 4, paragraph 7 - page 6, paragraph 1; figures 1-3 *	1-8	

TECHNICAL FIELDS SEARCHED (IPC)
E01F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	11 August 2023	Giannakou, Evangelia

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 22 18 8805

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.

11-08-2023

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 2374769 A1	12-10-2011	NONE	
WO 2018024263 A1	08-02-2018	CZ 306948 B6	04-10-2017
		WO 2018024263 A1	08-02-2018
CN 106801387 A	06-06-2017	NONE	
CZ 35436 U1	27-09-2021	CZ 35436 U1	27-09-2021
		SK 500652022 U1	11-01-2023
WO 2015140584 A1	24-09-2015	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- CN 207159852 U **[0006]**
- CN 210216199 U **[0007]**

Non-patent literature cited in the description

- **STANSFELD, S. A. ; MATHESON, M. P.** Noise pollution: non-auditory effects on health. *British Medical Bulletin,* 2003, vol. 68 (1), 243-257, https://doi.org/10.1093/bmb/ldg033 **[0023]**
- **OTOKORKULUK, S. B.- Y. Y. M.** SES bariyeri, Gürültü bariyeri - Yente Yapi Ankara. *Otokorkuluk, Ses Bariyeri - Yente Yapi Makine. Retrieved,* 01 December 2019, https://www.yente.com.tr/tr/ses-bariyeri **[0023]**
- **BARIYERI, H. S.** Akustik Bariyer Nedir ve Nerelerde Kullanilir?. *Hatko Ses Bariyeri,* 28 January 2021, https://hatkosesbariyeri.com/akustik-bariyer-nedir/#:%7E:text=G%C3%BCr%C3%BClt%C3%BCn%C3%BCn%20yay%C4%B1lmas%C4%B1n%C4%B1%20engelleyen%20bu%20engeller,i%C3%A7in%20bu%20%C3%BCr%C3%BCnler%20%C3%A7ok%20kullan%C4%B1%C5%9Fl%C4 %B1d%C4%B1r. **[0023]**
- **BRIGGS, B. H.** Demand for rubber ''threatens forests. *BBC News,* 17 April 2015, https://www.bbc.com/news/science-environment-32350985 **[0023]**