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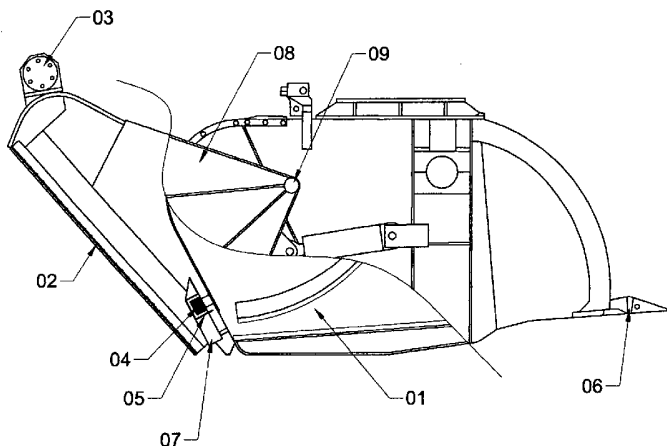


Fig. 1

(57) Abstract: Described is a device suitable for crushing and screening stony material, comprising a bucket with an inlet for receiving the stony material for crushing and screening and an outlet for discharging the crushed and screened material, and a jaw crusher (01), wherein the bucket comprises a screen (02) with substantially square openings of about X by X mm, wherein X is about 5 - 100, the screen being placed such that during operation the crushed material is guided over the screen. In a preferred embodiment the bucket comprises a magnet (04) for demagnetizing the crushed material. Further described is a method for obtaining a 0 - X fraction of crushed stony material, wherein stony material is guided over the device as described above. A method is also described for obtaining a demagnetized 0 - X fraction of crushed stony material, wherein stony material is guided over the preferred embodiment of the device with magnet.



DEVICE FOR CRUSHING, SCREENING AND DEMAGNETISING STONY MATERIAL

5 The invention relates to a device suitable for crushing and screening stony material, comprising a bucket with an inlet for receiving the stony material for crushing and screening and an outlet for discharging the crushed and screened material, and a jaw crusher. The invention further relates to a method for obtaining a 0 - X fraction of stony material, wherein X is about 5 - 100.

10 Such a device is known from the international patent publication WO 2006/105864, in which is described a bucket for riddling and crushing rubble. The screen is placed upstream of the jaw crusher as seen in the direction of the rubble for crushing, so that the material for crushing is first screened, wherein the dust, sand and finest material are removed. In a second embodiment the crushed material is also
15 screened in order to once again remove the finest material.

 The crushing part is described in detail in the European patents EP 1138834 and EP 1532321. This crushing takes place between two jaws in a jaw crusher, wherein in EP 1138834 a rotational movement of the jaws relative to each other is described, while
20 in EP 1532321 a translational movement of the jaws relative to each other also takes place. The distance between the two jaws however still defines the size of the smallest fraction, which always differs substantially from 0. Such a crushing device is therefore not suitable for obtaining a fraction of crushed material wherein the lower limit is 0, i.e. material of a size of only slightly more than 0 mm in length, width and height is
25 obtained at the maximum distance. This is a drawback when it is precisely the fraction of 0 - X which is important.

 This is the case for instance in the Netherlands where the 0 - 40 fraction of crushed stony material is applied for the laying of asphalt. After being crushed using for instance an above described prior art bucket, the broken rubble including dust, sand and fine material is guided for this purpose over a screening installation which screens out
30 the 0 - 40 fraction, wherein the larger pieces, the so-called oversize grain, is fed back again to the crushing bucket if desired. Since there is usually no space on-site for such a sizeable combination of devices of rubble crusher and screen, the rubble for crushing must generally be transported to rubble crushers situated at a fixed location. It will be

apparent that such a process entails high costs. The device provided by the present invention obviates these drawbacks.

The present invention has for its object to provide a device suitable for both crushing and screening and optionally demagnetizing stony material in order to produce
5 a 0 - X fraction of stony material.

The invention provides for this purpose a device suitable for crushing and screening stony material of the type stated in the preamble, characterized in that the bucket comprises a screen with openings such that the fraction of dimension X by X mm, wherein X is about 5 - 100, is allowed through, the screen being placed such that
10 during operation the crushed material is guided over the screen. X is preferably about 20 - 60, X is more preferably about 30 - 50, X is most preferably 40, or about 40. The bucket comprises for instance a screen with substantially square openings of about X by X mm, wherein X is about 5 - 100. When X is 40, the bucket comprises a screen with substantially square openings of about 40 by 40 mm.

15 The screen is preferably mounted on a tilting suspension system, preferably via rubber seals. This suspension system particularly comprises at least one hinge and one hydraulic cylinder. The screen is preferably further driven by a hydraulic vibration motor.

The bucket preferably further comprises a magnet in order to finally obtain a
20 demagnetized crushed product during operation. Use is particularly made of a permanent magnet. The magnet is situated particularly between jaw crusher and screen. More preferably arranged on this magnet is a non-magnetic cover which serves to enable the collected iron to be carried out of the magnetic field of the magnet and thus discharged. This cover is particularly of stainless steel.

25 According to another aspect of the invention, a method is further provided for obtaining a 0 - X fraction of stony material, wherein stony material is guided over the above described device. The invention particularly provides a method for obtaining a 0 - 40 fraction of stony material, wherein stony material is guided over the above described embodiment of the device, wherein the bucket comprises a screen with openings such
30 that the fraction with a size up to 40 by 40 mm is allowed through, preferably with substantially square openings of about 40 by 40 mm.

The invention more particularly provides a method for obtaining a demagnetized 0 - X fraction of stony material, wherein stony material is guided over the above described device, wherein the bucket comprises a magnet. The invention especially provides a method for obtaining a demagnetized 0 - 40 fraction of stony material, wherein stony material is guided over the device, wherein the bucket comprises a screen with openings such that the fraction of a size up to 40 by 40 mm is allowed through, for instance with substantially square openings of about 40 by 40 mm and a magnet.

In this patent specification a 0 - X fraction, with X is 5 - 100, must be understood to mean a 0 - 5 to 0 - 100 fraction. This is obtained when the crushed material is guided over a screen with openings such that the fraction of a size up to respectively 5 by 5 mm and up to 100 by 100 mm is allowed through, preferably with substantially square openings of about 5 mm by 5 mm up to 100 mm by 100 mm, and the desired 0 - X fraction allowed through by the screen is collected. In addition to square openings, any other form such as round openings with a radius of $X\sqrt{2}/2$ can be applied. It will be apparent to the skilled person that, when a hydraulic vibration motor is applied in the case of a screen with X mm by X mm, the actual resulting grains will on average be smaller than X by X mm. Making use of such a vibration motor, a screen with openings of 40 by 40 mm can for instance be applied to obtain a mixed granulate of 0 - 31.5 (mm), as stated in the Netherlands Assessment Guideline BRL 2506 of 10.12.2004.

In this patent specification stony material is also understood to mean fine material such as dust and sand; when reference is made to crushing of stony material, this is of course only applicable in the case of dust and sand to the extent that further crushing is possible. Oversize grain is understood to mean that material which cannot pass through the openings of the screen and therefore remains lying on the screen. Demagnetizing is also understood to mean deferrizing.

The present invention will be further elucidated hereinbelow. Since all the presented stony material is crushed, no screen is present upstream of the jaw crusher. The device according to the present invention is preferably further provided with coupling means with which it can be mounted on an excavating machine. When rubble has to be crushed, this can take place easily with the device according to the invention at the location itself of the material to be crushed. The material for crushing is shovelled up, guided through the jaw crusher, which crushes it into smaller pieces. This crushed

material is then guided as desired past a magnet and deferrized or demagnetized. In order to separate out a 0 - X fraction of crushed material, the whole of the crushed material is guided over a screen with openings such that the fraction of a size up to about X by X mm is allowed through. What remains on the screen is collected and
5 guided once again through the device so that it will generally form part of the desired 0 - X fraction in one of the following cycles. The great advantage of applying such a device is that, since crushing and obtaining the desired 0 - X fraction takes place in one device, this can take place in many more cases at the same location as where demolition takes place, this reducing transport costs. Operation of the device according to the
10 invention also requires only one person, this in contrast to the known crushing and screening devices where two people are required for operation.

The present invention will be further elucidated with reference to the following schematic drawings:

15 Figure 1 shows a fragmented representation of a side view of a device for crushing and screening stony material, coupled to a loading shovel (06) for collecting the material for crushing, comprising a hydraulically driven jaw crusher (01) and suspended together with a screen (02) with hydraulic vibration block (03) around a tilting suspension system (08) provided with a hinge (09) and a magnet (04) with cover
20 (05).

Figure 2 is a side view of the device shown in figure 1 without the hydraulically driven jaw crusher, with the screen (02) in closed position and in vertical direction and the receiving bin (07) for receiving the iron collected on the magnet.

25 The figures are predominantly schematic and not drawn to scale. Corresponding parts are designated in the figures with the same reference numeral.

Figure 1 shows in somewhat fragmented manner the side of the device according to the invention, wherein a part of the jaw crusher (01) is visible, while it is in fact concealed behind the suspension system of the screen. A non-magnetic cover (05) is
30 arranged on magnet (04) to enable the collected magnetic material, such as iron, to be carried out of the magnetic field of the magnet, to be collected in receiving bin (07) and then be discharged.

Figure 2 shows that after screening the screen is tilted upward via hinge (09), wherein the oversize grain slides off the screen. This stony material, with a size roughly of above X by X mm, is collected in order to generally undergo another process cycle. In a separate operation the magnetic material is particularly released from magnet (04) into receiving bin (07). The non-magnetic cover (05, not shown) is opened here. The screened demagnetized 0 - X fraction is collected together as end product during the screening.

Finally, it must be expressly noted that preferred embodiments of the invention are described in the present patent application, and that further modifications and the like are of course possible without the scope of protection of this patent specification being limited.

Claims

1. Device suitable for crushing and screening stony material, comprising a bucket with an inlet for receiving the stony material for crushing and screening and an outlet
5 for discharging the crushed and screened material, and a jaw crusher, characterized in that the bucket comprises a screen with openings such that the fraction of dimension X by X mm, wherein X is about 5 - 100, is allowed through, the screen being placed such that during operation the crushed material is guided over the screen.
- 10 2. Device as claimed in claim 1, characterized in that the bucket comprises a screen with substantially square openings of about X by X mm, wherein X is about 5 - 100.
3. Device as claimed in claim 1 or 2, characterized in that the screen is mounted on a
15 tilting suspension system.
4. Device as claimed in claim 3, characterized in that the screen is mounted on the
tilting suspension system via rubber seals.
5. Device as claimed in claim 4, characterized in that the suspension system
20 comprises at least one hinge and one hydraulic cylinder.
6. Device as claimed in one or more of the claims 1-5, characterized in that the
screen is driven by a hydraulic vibration motor.
- 25 7. Device as claimed in one or more of the claims 1-6, characterized in that the
bucket comprises a magnet.
8. Device as claimed in claim 7, characterized in that a cover is arranged on the
magnet.
- 30 9. Device as claimed in claim 7 or 8, characterized in that the magnet is situated
between the jaw crusher and the screen.

10. Device as claimed in one or more of the claims 1-6, characterized in that X is 40.
11. Device as claimed in one or more of the claims 7-9, characterized in that X is 40.
- 5
12. Method for obtaining a 0 - X fraction of stony material, characterized in that stony material is guided over the device as specified in one or more of the claims 1-9.
13. Method for obtaining a 0 - 40 fraction of stony material, characterized in that
10 stony material is guided over the device as specified in claim 10.
14. Method for obtaining a demagnetized 0 - X fraction of stony material,
characterized in that stony material is guided over the device as specified in one or more
of the claims 7-9.
- 15
15. Method for obtaining a demagnetized 0 - 40 fraction of stony material,
characterized in that stony material is guided over the device as specified in claim 11.

1/2

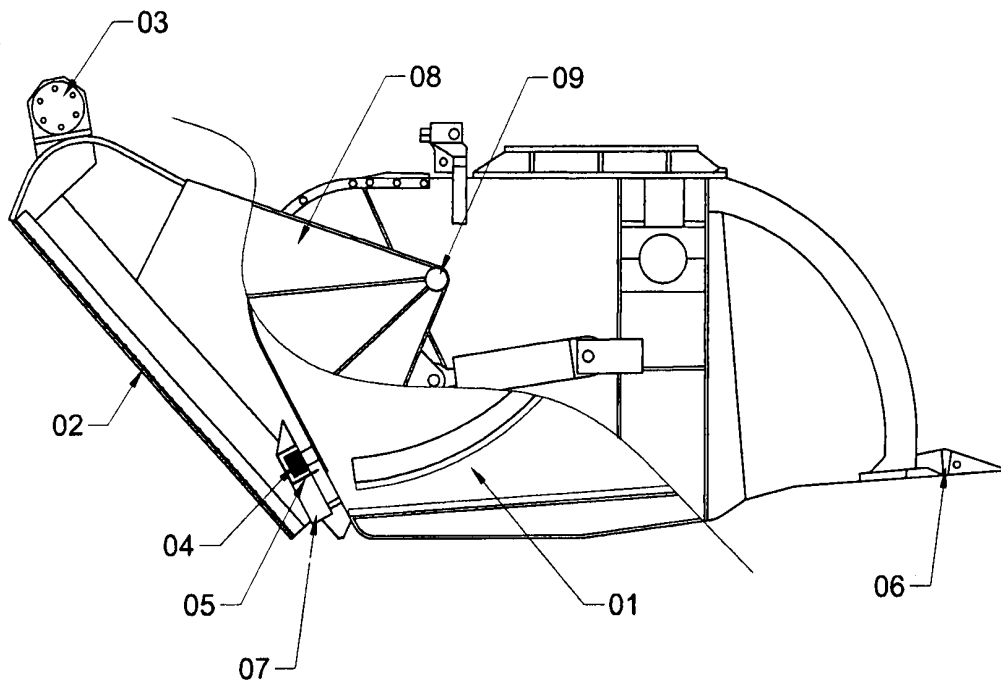


Fig. 1

2/2

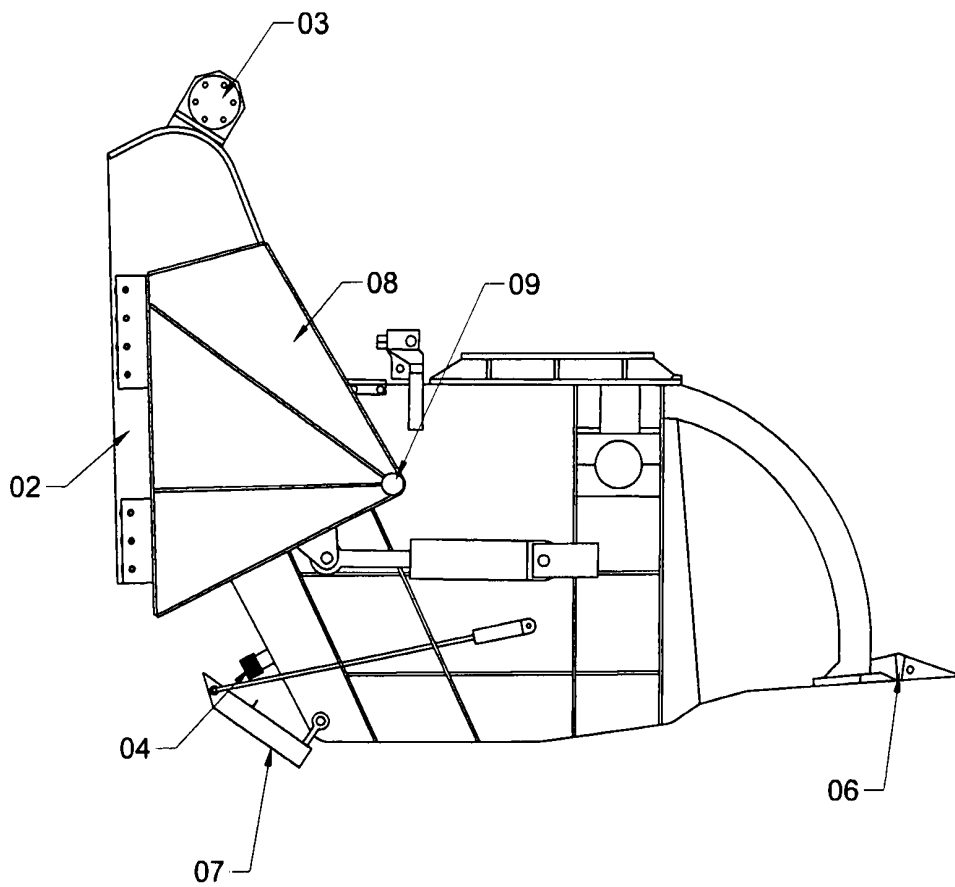


Fig. 2

INTERNATIONAL SEARCH REPORT

International application No
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A. CLASSIFICATION OF SUBJECT MATTER
INV. E02F3/40 E02F3/96
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
E02F B07B E01C B02C E04G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, PAJ

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Y	page 5 - page 6 figures 4-6	7
Y	----- CA 2 247 715 A1 (IDEACHIP OY INSINOEOERITOIMIST [FI] INT EPODOC CAESAR ACCESSION NUMBER) 18 March 2000 (2000-03-18)	2
A	figures 5,10,11 figures 12A-12C page 4	1
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A	figures 5-7 -----	9
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See patent family annex.

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INTERNATIONAL SEARCH REPORT

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PCT/NL2010/000028

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