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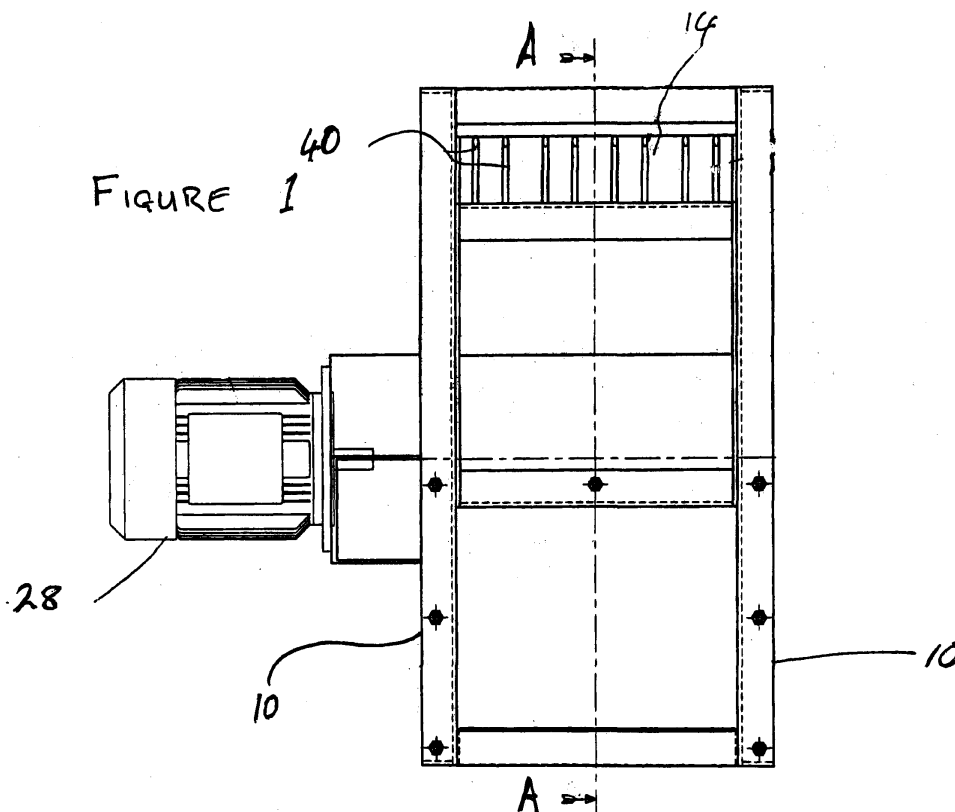
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(54) **Disposal of waste sheet material**

(57) To dispose of sheet material such as printed material, eg newsprint, from production machinery at high speed, the waste material is shredded into strips and fed directly to an air conveyor duct. To facilitate dis-

posal of the large quantity of waste that may be generated during set-up of the production machinery, the waste may be received direct from the mechanical conveyor system of the machinery.



Description

[0001] This invention relates to the disposal of waste sheet material such as paper and card. More particularly but not exclusively it relates to the disposal of waste newsprint.

[0002] When a large high speed newsprint production machine is being set up, a considerable quantity of waste newsprint may be produced. This has to be disposed of.

[0003] It has been proposed to do this by way of an air conveyor, ie one or more ducts and a motorised fan for causing high speed air to flow along the duct. Material fed into one of the ducts is conveyed to a waste disposal location by the action of the airflow. However, the quantity of waste may be too great especially since newsprint is generally the wrong shape anyway. Hence even though an air conveyor system may be available at the production site to deal with other items or for small quantities of paper, a mechanical conveyor may have to be provided or alternatively it may be necessary simply to load the waste in a cage and fork lift it to the disposal location.

[0004] An object of this invention is facilitate the disposal of waste sheet material, such as newsprint.

[0005] Another object of this invention is to reduce the size of the waste product at source, converting it at high speed into smaller sections and simultaneously destroying any print copy.

[0006] A yet further object is to accept waste sheet material directly into a relatively small air conveying duct, for example with a view to automating the waste extraction system.

[0007] According to one aspect of the invention, there is provided sheet material disposal apparatus comprising shredder means for shredding the sheet material and air conveying means coupled to the shredder means for receiving the shredded sheet material and conveying it away from the shredder means.

[0008] The air conveying means may comprise duct means for being coupled to an air conveying facility pre-existing at a site where the apparatus is to be installed.

[0009] Preferably, the apparatus includes receiving and guiding means for receiving said sheet material and for guiding the received sheet material to said shredder means.

[0010] It may be required to destroy any spoilt or otherwise undesirable copy immediately so as to ensure that no unauthorised material goes into circulation. Therefore, ideally, the shredder means is operable to destroy the sheet material in the sense of rendering it unusable for its intended purpose, for example reducing printed matter to a state such that it could not be read and/or distributed.

[0011] The shredder means can comprise cutter means for cutting the sheet material and the cutter means is exposed to air flowing through said air conveying means so as to cool the cutting means.

[0012] Advantageously, the cutter means comprises a plurality of rotating disc-shaped knife blades spaced one from another for cutting the sheet material into strips. Then, the apparatus may comprise a housing and, in the housing, internal walls defining a passage that leads between an inlet and an outlet at respective opposite sides of the housing, said knife blades being mounted for rotation in the housing and extending into said passage for shredding the sheet material therein.

[0013] It is preferred that the aforementioned internal walls extend between opposite walls of said housing to define first, second and third discrete spaces within the housing, said blades being mounted in the first space and this first space having an opening therein for receiving air for cooling said blades. Meanwhile, the second space can form a dust extraction duct and the first and second spaces can have respective adjustable vents for balancing the flow of air through the passage and the ducts.

[0014] According to another aspect of the invention, there is provided a method for disposing of paper and card material, for example waste newsprint, the method comprising feeding the material to shredder means for the material to be cut into strips, and supplying the strips directly into air conveying means that conveys them away

[0015] A specific embodiment of the invention will now be described by way example with reference to the accompanying drawings, in which:

Figure 1 is an end view of sheet material disposal apparatus; and

Figure 2 is a section on the line AA in figure 1.

[0016] The disposal apparatus comprises a generally rectangular housing 1 made up of a front and a rear section 2 and 3 fixed together by bolts 4.

[0017] The rear section 3 is made up of two spaced side panels 5 between which there are fixed outer walls 6 and an internal wall 7. The walls 6 and 7 comprise honeycomb material for sound absorption. The wall 6 forming the rear wall of the housing 1 is provided with an opening 8 for receiving air into the housing 1.

[0018] Meanwhile, the front section 2 of the housing 1 comprises spaced side panels 10 with interior and exterior sound absorbing honeycomb walls 12 fixed between the side panels by bolts 13.

[0019] The front of the housing 1 is partly defined by a panel 11 having a right-angled bend along its length between the two side panels 10, ie so that in cross-section the panel has the shape of a triangular trough but with the mouth of the trough facing out to the front of the housing 1.

[0020] Just above the panel 11, there is a waste receiving opening 14 leading to an aerodynamically designed intake duct 15. The duct 15 is defined by the upper-most portion of the wall 11 and one of the interior

intermediate walls 12, this wall lying generally parallel to the upper-most portion of the wall 11. Thus, the duct has a uniform rectangular cross-sectional shape and it extends downwards into the housing 1. The innermost end of the duct 15 is adjacent a space 16 in which there is a transversely extending shaft 18 carrying a plurality of axially spaced cutting discs or saw blades 17. A short downwardly depending cross panel 19 is fixed to the inner end of the duct 15 to guide waste product to the saw blades 17. A further cross-panel 20 is arranged to lie over the shaft 18 and between duct 15 and the shaft.

[0021] The top surface of housing 1 also has an opening 21 for admitting air to the space 16. In addition, there is an exit opening 22 connected to a standard air conveying pick-up duct 23 (shown in dashed outline).

[0022] Within the housing the internal walls 6, 7 and 12 and panels 11, 19 and 20, create three ducts 24, 25 and 26 which join to form a single duct at the cutting area 16 which then leads to the exit 19. The blades 17 extend through aligned slits in the two partitions 19 and 20 to traverse the space 16. The slits may cooperate with the blades to form cooperating cutting members.

[0023] An electric motor 28 is mounted on the side of the housing and is coupled to a portion of the shaft 18 which projects from the housing. When the motor 28 is energised, it will thus rotate the blades 17.

[0024] The duct 25 acts to collect dust generated by the cutting action. The duct 26 provides a path for cooling air to impinge upon the blades 17. Each duct is fitted at its upstream end with adjustable air intake dampers 30 to enable the air volumes to be adjusted and controlled. The openings 8 and 21 may be covered by louvre panels or the like. At the downstream end, each duct 24, 25 and 26 communicates with the pick up duct 15. In operation, the blades cut the waste product (not shown) into multiple strips and so converts it into a form that is acceptable to the extraction system. The overall dimensions of the machine, the pitch of the blades and the duct size required is infinitely variable as each unit is designed to suite the product concerned.

[0025] Referring to the intake 14, the term aerodynamically designed applies to the inclusion of a series of rods 40 which are attached to the upper and lower faces of the duct 15 and are aligned in the direction of waste flow. The purpose of these rods is to prevent waste from sticking to the upper or lower faces of the duct by preventing an area of low pressure from forming between the waste material and the upper or lower face of the duct. This low-pressure area would cause the waste to be attracted to the surfaces of the inlet and thus cause a blockage. The ends of the upper set of rods are bent downwards to direct the cut material away from the cutting blade and into the airflow.

[0026] In the apparatus shown, the various airways are utilized to control the movement of the waste product around the cutting blades. This is facilitated by dampers 30, ie adjustable butterfly gates in this case, in each airway which enable each machine to be 'fine tuned' to the

individual waste products handling characteristics.

[0027] As shown by dotted lines 50 and 51, there is available adjustment on the shaft 18 to permit alteration of the claw effect of the blade on the waste product ie that waste is drawn through and past the cutting blade by virtue of the cutting action pulling on the waste. Depending upon the particular waste product concerned, it may be appropriate to provide a powered feed into the intake 14.

[0028] Here, the waste product is newsprint formed by a production machine (not shown) during set-up of the machine. The machine is likely to have a conveyor system and the shredder shown in figures 1 and 2 and conveyor system are arranged so that, at the appropriate time, ie during the set-up process, waste newsprint is delivered by the conveyor system of the production machine directly and continuously to the intake 14. This ensures that no spoilt or unauthorised copy is distributed by mistake. To facilitate this, the cutter blades may be set to render the waste material clearly unsuitable for distribution or even unreadable

Claims

1. Sheet material disposal apparatus comprising:

shredder means for shredding the sheet material; and
air conveying means coupled to the shredder means for receiving the shredded sheet material and conveying it away from the shredder means.

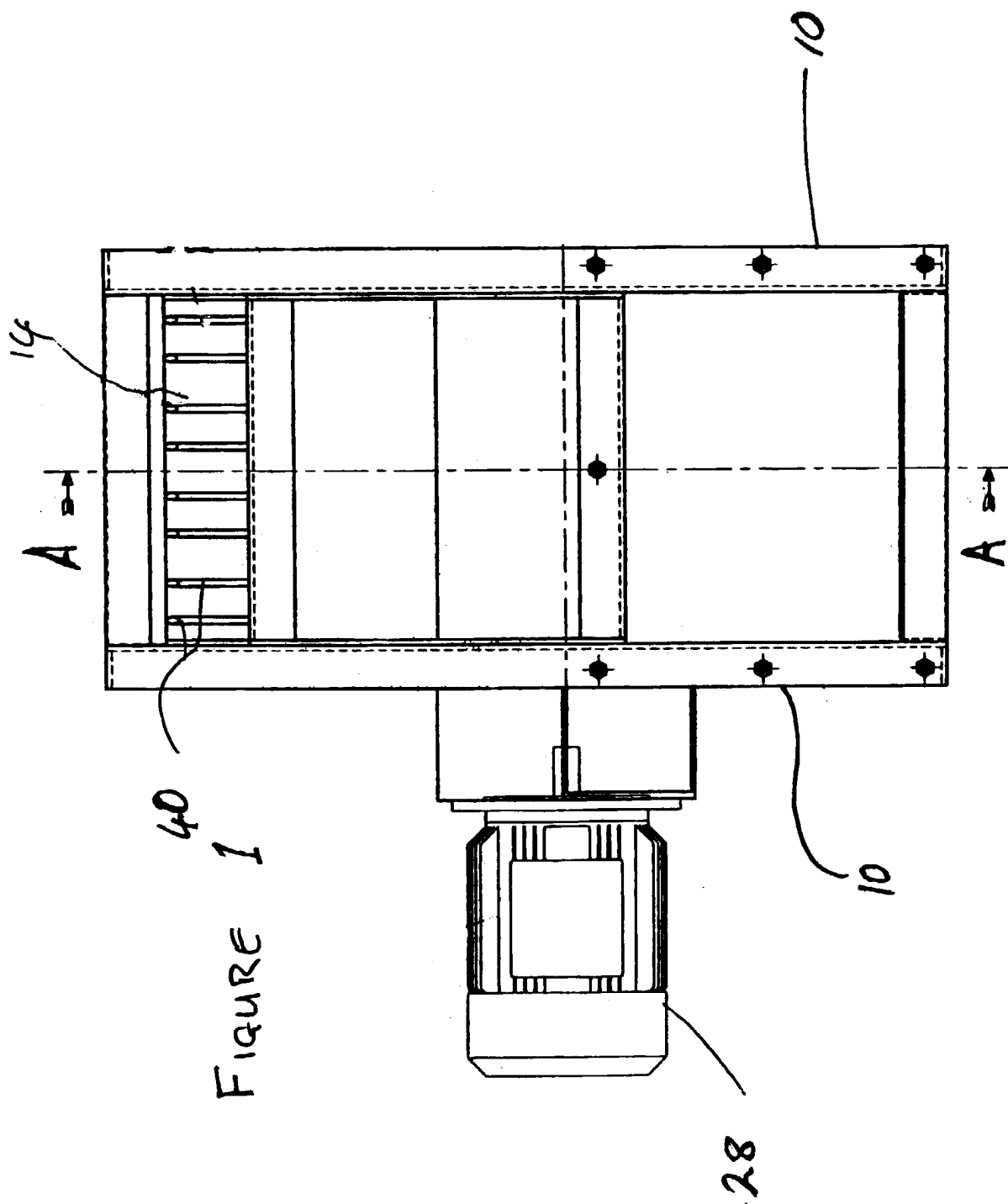
2. Sheet material disposal apparatus according to claim 1, wherein the air conveying means comprises duct means for being coupled to an air conveying facility pre-existing at a site where the apparatus is to be installed.

3. Sheet material disposal apparatus according to claim 1 or 2, including receiving and guiding means for receiving said sheet material and for guiding the received sheet material to said shredder means.

4. Sheet material disposal apparatus according to claim 1, 2 or 3, wherein the shredder means is operable to destroy the sheet material in the sense of rendering it unusable for its intended purpose, for example reducing printed matter to a state such that it could not be read and/or distributed.

5. Sheet material disposal apparatus according to any preceding claim, wherein the shredder means comprises cutter means for cutting the sheet material and the cutter means is exposed to air flowing through said air conveying means so as to cool the cutting means.

6. Sheet material disposal apparatus according to claim 5, wherein the cutter means comprises a plurality of rotating disc-shaped saw blades spaced one from another for cutting the sheet material into strips. 5
7. Sheet material disposal apparatus according to claim 6, comprising a housing and, in the housing, internal walls defining a passage that leads between an inlet and an outlet at respective opposite sides of the housing, said cutting blades being mounted for rotation in the housing and extending into said passage for shredding the sheet material therein. 10 15
8. Sheet material disposal apparatus according to claim 7, wherein said internal walls extend between opposite walls of said housing to define first and second discrete spaces within the housing, said blades being mounted in the first space and this first space having an opening therein for receiving air for cooling said blades. 20 25
9. A method for disposing of paper and card material, for example waste newsprint, the method comprising feeding the material to shredder means for the material to be cut into strips, and supplying the strips directly into air conveying means that conveys them away from the shredder means. 30 35 40 45 50 55



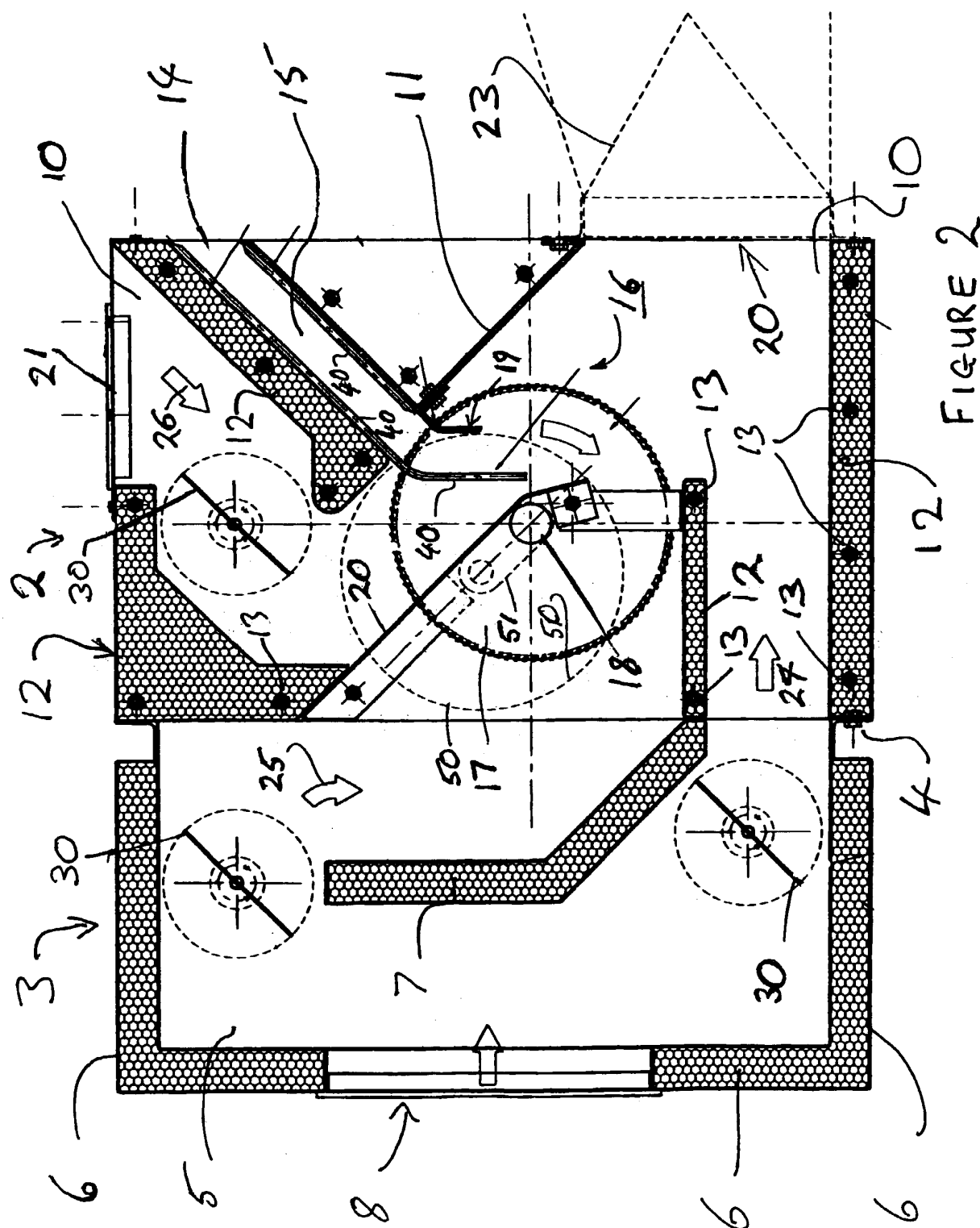


FIGURE 2



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Application Number
EP 99 30 5249

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The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 13 December 1999	Examiner Verdonck, J
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			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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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
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