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(71) Applicant: **SCM Group S.p.A.**
47921 Rimini (RN) (IT)

(72) Inventor: **VENTURINI, Marco**
47921 RIMINI (RN) (IT)

(74) Representative: **Tiburzi, Andrea et al**
Barzanò & Zanardo Roma S.p.A.
Via Piemonte 26
00187 Roma (IT)

(54) SANDER MACHINE WITH SAFETY SYSTEM TO PREVENT THE EJECTION OF PANELS

(57) The present invention relates to a sander machine (1) for sanding at least one panel (P), comprising an operative station (3) which is provided with an inlet (4) and an outlet (5) which is placed downstream from said inlet (4); at least one transporting member (6) for transporting, in use, said at least one panel (P), according to a transporting speed, from said inlet (4) to said outlet (5) according to a predetermined advancing direction (F); at least one rotating abrasive member (7, 8, 9) for sanding said at least one panel (P) placed on said at least one transporting member (6), said at least one rotating abrasive member (7, 8, 9) being rotatable in the same direction as said predetermined advancing direction (F) and placed above said at least one transporting member (6) between said inlet (4) and said outlet (5); said sander machine (1) being characterized in that it comprises a braking device (13) comprising in turn a rolling member (131) which is able to roll on said at least one panel (P) and arranged facing said outlet (5) and above said at least one transporting member (6) between said at least one rotating abrasive member (7, 8, 9) and said outlet (5); and a braking member (132) which is connected with said rolling member (131) and able to slow down the rolling of said rolling member (131) such as to brake an advancing movement of said at least one panel (P).

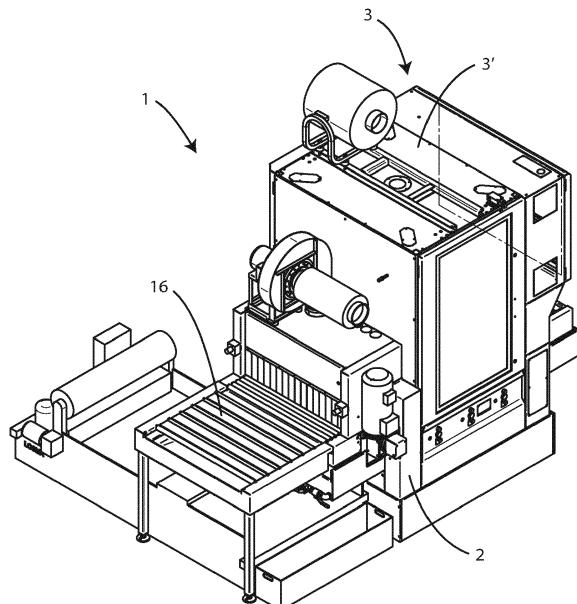


Fig. 1

Description

[0001] The present invention relates to a sander machine with a safety system to prevent the ejection of panels.

[0002] In particular, the safety system which the sander machine according to the invention is equipped with, turns out to be particularly effective in the case of processing metal panels, although it finds advantageous application in the case of non-metal panels.

[0003] More specifically, the invention relates to a sander machine equipped with one or more rotary sanding members and a braking member arranged downstream of the latter, to reduce the advancement speed of the panels being processed in the cases in which these have accumulated, due to the effect of the smoothing action of the smoothing members themselves, kinetic energy that is too high and therefore dangerous for the safety of the operators.

[0004] In the following, the description will be directed to the metal panels processing, but it is clear that it should not be considered limited to this specific use, since the machine proposed here can also be used for processing panels made of wood or other material.

[0005] Traditional sander machines for the treatment of metal panels comprise one or more conveyor belts for transporting the panels to be processed, and one or more abrasive rollers arranged above said conveyor belts to smooth the upper face of the panels.

[0006] Normally, in these machines, the rotation direction of the abrasive rollers is concordant with the advancement direction of the panel being processed.

[0007] This type of working process has among the various residual risks that of the possible ejection of the panels leaving the machine, deriving from the fact that the tangential component of cutting, or abrasion, is parallel to the panel advancement plane.

[0008] To overcome this problem, in correspondence with the exit area of the recently manufactured sander machines a series of idle rubber rollers have been provided, arranged in such a way as to exert a load or a progressive pressure on the panels, such as to achieve a dissipation of the accumulated kinetic energy from the panels.

[0009] However, this type of solution proves to be ineffective in situations of low friction between the idle rubber rollers and the panel, due for example to the presence of water on the surface of the latter, or in case of setting errors in the height of the aforementioned rollers; in these cases, in fact, there would be an insufficient level of friction on the panels to dissipate the excess kinetic energy.

[0010] To overcome this problem, the preloading of the aforesaid rollers could be increased; however, this type of technical expedient is not feasible, since it would trigger further problems related to the functionality of the machine and the possibility of damaging the coating of the rollers themselves.

[0011] In light of the above, it is therefore an object of

the present invention to provide a sander machine with a safety system to prevent the ejection of panels that solves the problems of the prior art described above.

[0012] Another object of the invention is to provide a sander machine with a safety system to prevent the ejection of panels, which does not compromise the safety of the operators present in the areas surrounding said machine.

[0013] A further object of the present invention is to provide a sander machine with a safety system to prevent the ejection of panels, which is such as to increase the passive safety of the machine itself.

[0014] It is therefore specific object of the present invention a sander machine for sanding at least one panel, comprising an operative station which is provided with an inlet and an outlet which is placed downstream from said inlet, at least one transporting member for transporting, in use, said at least one panel, according to a transporting speed, from said inlet to said outlet according to

20 a predetermined advancing direction, at least one rotating abrasive member for sanding said at least one panel placed on said at least one transporting member, said at least one rotating abrasive member being rotatable in the same direction as said predetermined advancing direction

25 and placed above said at least one transporting member between said inlet and said outlet, said sander machine being characterized in that it comprises a braking device comprising in turn a rolling member which is able to roll on said at least one panel and arranged facing said outlet and above said at least one transporting member between said at least one rotating abrasive member and said outlet, and a braking member, which is connected with said rolling member and able to slow down the rolling of said rolling member such as to brake an advancing movement of said at least one panel.

[0015] Still according to the invention, said braking member comprises motor means which are connected with said rolling member and configured to make said rolling member rotate at a predetermined speed in the same direction as said at least one rotating abrasive member, such that said rolling member slips on said at least one panel slowing down the advancing movement of the at least one panel when said at least one panel exceeds said predetermined speed.

[0016] Further, according to the invention, said braking member further comprises a clutch arranged between said motor means and said rolling member.

[0017] Preferably according to the invention, said rolling member is a roller which is provided with an outer surface configured to generate, in use, friction with said at least one panel.

[0018] Always according to the invention, said predetermined speed of said rolling member is synchronized with said transporting speed of said at least one transporting member.

[0019] Still according to the invention, said outer surface of said roller is made of rubber.

[0020] Furthermore, according to the invention, said

outer surface of said roller is substantially smooth.

[0021] Preferably according to the invention, said rolling member protrudes downward by a predetermined height with respect to said at least one rotating abrasive member.

[0022] Still according to the invention, said machine can comprise at least one flexible means for transmitting a rotating motion, which is connected with said motor means and said rolling member to transmit a rotating motion from said motor means to said rolling member.

[0023] Still according to the invention, said machine can comprise a warning system that is configured to provide an operator with an acoustic and/or visual and/or tactile warning signal when said at least one panel is decelerated.

[0024] Further according to the invention, said warning system is configured to send said warning signal to wearable devices, and/or movable devices, and/or desktop personal computer.

[0025] Preferably according to the invention, said warning system is configured to send said warning signals to a remote cloud server, which sends, in turn, said warning signals to wearable devices, and/or movable devices, and/or desktop personal computer.

[0026] Always according to the invention, said warning system comprises an accelerometer configured to measure vibrations of said sander machine or said rolling member, or a sensor of capacitive, optic or inductive type, or a mechanical feeler configured to detect an anomaly, preferably a reduction and/or increase in the tension of said at least one flexible means.

[0027] Still according to the invention, said at least one transporting member comprises a conveyor belt.

[0028] The present invention will be now described, for illustrative but not limitative purposes, according to its preferred embodiments, with particular reference to the figures of the enclosed drawings, wherein:

figure 1 is an axonometric view of a sander machine according to the present invention;

figure 2 is a front view of the machine shown in figure 1;

figure 3 is a side view of the machine of figures 1 and 2;

figure 4 is a rear view of the machine shown in figures 1-3; and

figure 5 is a sectional view taken along the section line AA indicated in figure 4.

[0029] In the various figures, similar parts will be indicated by the same reference numbers.

[0030] With reference to the attached figures, with 1 it is indicated a sander machine according to the present invention.

[0031] Said sander machine 1 comprises a frame 2 and an operative station 3 supported by said frame 2.

[0032] The operative station 3 provides an external cabin or an external casing 3', in which an inlet 4 and an

outlet 5 are defined for the panels to be treated or to be sanded.

[0033] In order to transport the panel P to be treated from inlet 4 to outlet 5, a conveyor belt 6 is provided in the same operative station 3, which moves according to a transporting speed, operating in such a way as to impart a movement to said panel P according to a predetermined advancement direction F.

[0034] Within the external casing 3' there are, above the conveyor belt 6, three abrasive rollers 7, 8, 9 to allow the sanding of the upper face of the panel P.

[0035] Said abrasive rollers 7, 8, 9 are arranged one after the other according to said predetermined advancement direction F, and can be operated by means of respective drive systems 10, 11, 12, so as to be capable of rotating around the respective rotation axes in a direction according to this predetermined advancement direction F.

[0036] In particular, the rotation axes of the three abrasive rollers 7, 8, 9 are parallel to the plane, on which the panel P lies and moves in the operative station 3.

[0037] Within the outer casing 3', a braking device 13 is provided, comprising a rolling member 131, such as a roller, and a braking member 132, coupled to said rolling member 131.

[0038] Said roller 131 is provided with a substantially smooth rubber coating.

[0039] Said roller 131 is arranged downstream of the abrasive rollers 7, 8, 9, and precisely between the outlet 5 and the abrasive roller 9 closest to it.

[0040] In particular, said roller 131 is arranged opposite said outlet 5, and above said conveyor belt 6, between said at least one rotary abrasive member 7, 8, 9 and said outlet 5.

[0041] Between this abrasive roller 9 and the outlet 5 there are therefore no further operative members for polishing the panel P.

[0042] The roller 131 is arranged above the conveyor belt 6 and is also rotatable around a fixed axis of rotation parallel to the aforementioned lying plane in a direction concordant with said predetermined advancement direction F.

[0043] In particular, the roller 131 is positioned in such a way that it protrudes below by a predetermined height with respect to the abrasive rollers 7, 8, 9, so that the same roller 131 is capable of exerting a pressure on the panel P while transiting on the conveyor belt 6.

[0044] Said braking member 132 is capable of driving said roller 131 in rotation around its own axis by means of a motor controlled by an inverter and a chain 14 or a belt to transmit the rotary motion from said motor to the roller 131.

[0045] In particular, it is possible that between said motor and said roller 131 there is friction or a friction joint, capable of decoupling the rotation speed of the roller 131 from the rotation speed of the motor, in case of said panel P advances at a speed higher than the motor rotation speed.

[0046] Therefore, due to the presence of the clutch, said roller 131 is subject to less wear.

[0047] The sander machine 1 also comprises an alarm system for providing an audible and/or visual alarm signal to the operator in case of braking of the panel P by the roller 131.

[0048] In particular, the aforementioned warning system comprises an accelerometer suitable for measuring the vibrations of the sander machine 1 or of the roller 131, or a sensor 15 of capacitive, optical or inductive type or a mechanical feeler associated with the chain or transmission belt of the roller 13 to detect the sudden movement of said chain or belt caused by the impact suffered by the latter during the braking.

[0049] Said warning system is configured to send an acoustic, and/or visual, and/or tactile alarm signal to an operator in case of the braking of said at least one panel P, or to wearable devices, and/or mobile devices, and/or desktop personal computers.

[0050] Furthermore, said warning system is configured to send said alarm signal to a remote cloud server, which in turn sends said alarm signal to wearable devices, and/or mobile devices, and/or desktop personal computers.

[0051] Downstream the outlet 5 of the operative station 3 there is a pick-up area 16 to receive the panel P already smoothed by the abrasive rollers 7, 8, 9, and possibly braked by the roller 131.

[0052] Therefore, in the cases where the panel P accumulates considerable kinetic energy due to the sanding action of the abrasive rollers 7, 8, 9, the roller 131 automatically enters into action, performing its braking function on the panel P itself, and preventing the violent ejection of the latter from exit 5, which if it occurs could seriously compromise the safety of the operators.

[0053] The aforesaid braking action is possible thanks to the friction that is created between the rubberized part of the roller 131 and the upper face of the panel P due to the pressure exerted on the latter by the roller 131.

[0054] As can be seen from the above description, the roller 131 and the members and the devices associated with it to allow their correct operation, allow to effectively exclude any risk of violent ejection of the panels P from the sander machine 1.

[0055] The exclusion of this risk is extremely important for the safety of the operators in any case and in particular in the case of sanding metal panels.

[0056] The present invention has been described for illustrative but not limitative purposes, according to its preferred embodiments, but it is to be understood that modifications and/or changes can be introduced by those skilled in the art without departing from the relevant scope as defined in the enclosed claims.

Claims

1. Sander machine (1) for sanding at least one panel

(P), comprising

an operative station (3) which is provided with an inlet (4) and an outlet (5) which is placed downstream from said inlet (4);

at least one transporting member (6) for transporting, in use, said at least one panel (P), according to a transporting speed, from said inlet (4) to said outlet (5) according to a predetermined advancing direction (F);

at least one rotating abrasive member (7, 8, 9) for sanding said at least one panel (P) placed on said at least one transporting member (6), said at least one rotating abrasive member (7, 8, 9) being rotatable in the same direction as said predetermined advancing direction (F) and placed above said at least one transporting member (6) between said inlet (4) and said outlet (5);

said sander machine (1) being characterized in that it comprises a braking device (13) comprising in turn a rolling member (131) which is able to roll on said at least one panel (P) and arranged facing said outlet (5) and above said at least one transporting member (6) between said at least one rotating abrasive member (7, 8, 9) and said outlet (5); and a braking member (132) which is connected with said rolling member (131) and able to slow down the rolling of said rolling member (131) such as to brake an advancing movement of said at least one panel (P).

2. Sander machine (1) according to claim 1, characterized in that said braking member (132) comprises motor means which are connected with said rolling member (131) and configured to make said rolling member (131) rotate at a predetermined speed in the same direction as said at least one rotating abrasive member (7, 8, 9), such that said rolling member (131) slips on said at least one panel (P) slowing down the advancing movement of the at least one panel (P) when said at least one panel (P) exceeds said predetermined speed.
3. Sander machine (1) according to the preceding claim, characterized in that said braking member (132) further comprises a clutch arranged between said motor means and said rolling member (131).
4. Sander machine (1) according to any one of preceding claims, characterized in that said rolling member (131) is a roller which is provided with an outer surface configured to generate, in use, friction with said at least one panel (P).
5. Sander machine (1) according to any one of claims 2-4, characterized in that said predetermined speed of said rolling member (131) is synchronized with said transporting speed of said at least one transporting member (6).

6. Sander machine (1) according to any one of claims 4 or 5, **characterized in that** said outer surface of said roller (131) is made of rubber.
7. Sander machine (1) according to any one of claims 4-6, **characterized in that** said outer surface of said roller (131) is substantially smooth.
8. Sander machine (1) according to any one of preceding claims, **characterized in that** said rolling member (131) protrudes downward by a predetermined height with respect to said at least one rotating abrasive member (7, 8, 9). 10
9. Sander machine (1) according to any one of preceding claims, **characterized in that** it comprises at least one flexible means (14) for transmitting a rotating motion, which is connected with said motor means and said rolling member (131) to transmit a rotating motion from said motor means to said rolling member (131). 15
10. Sander machine (1) according to any one of preceding claims, **characterized in that** it comprises a warning system which is configured to provide an operator with an acoustic and/or visual and/or tactile warning signal when said at least one panel (P) is decelerated. 20 25
11. Sander machine (1) according to claim 10, **characterized in that** said warning system is configured to send said warning signal to wearable devices, and/or movable devices, and/or desktop personal computer. 30 35
12. Sander machine (1) according to claim 11, **characterized in that** said warning system is configured to send said warning signals to a remote cloud server, which sends, in turn, said warning signals to wearable devices, and/or movable devices, and/or desktop personal computer. 40
13. Sander machine (1) according to any one of claims 10-12, **characterized in that** said warning system comprises an accelerometer configured to measure vibrations of said sander machine (1) or said rolling member (131), or a sensor (15) of capacitive, optic or inductive type, or a mechanical feeler configured to detect an anomaly, preferably a reduction and/or increase in the tension of said at least one flexible means (14). 45 50
14. Sander machine (1) according to any one of preceding claims, **characterized in that** said at least one transporting member comprises a conveyor belt (6). 55

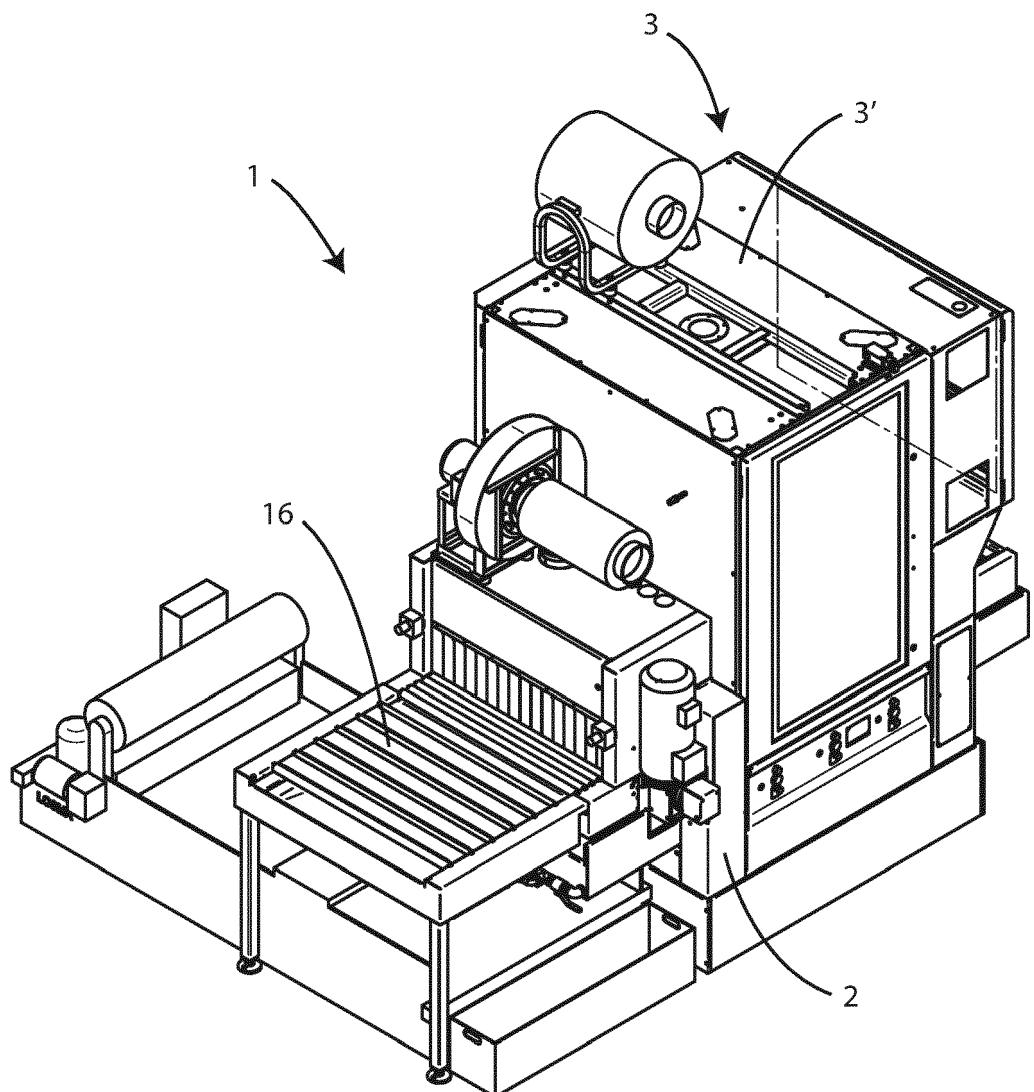


Fig. 1

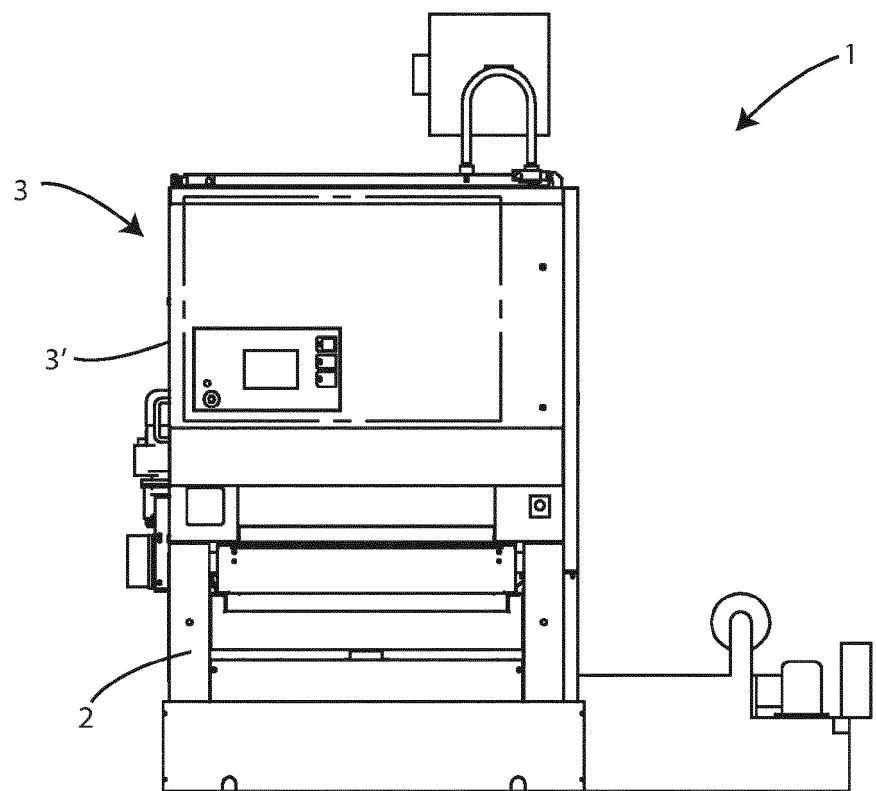


Fig. 2

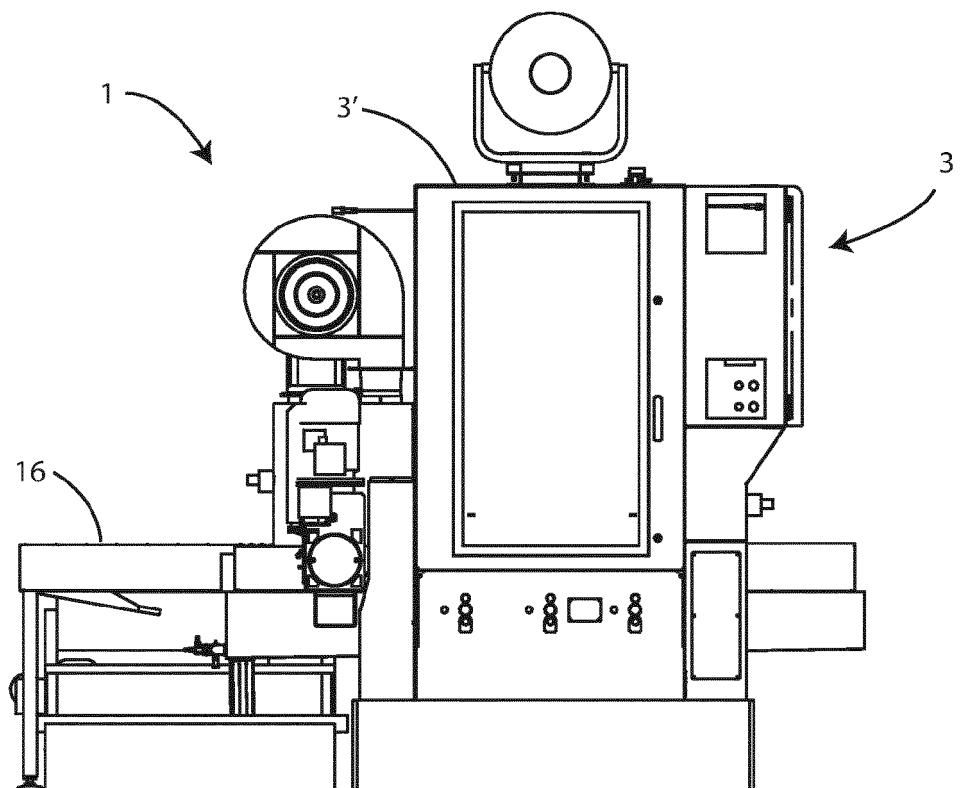
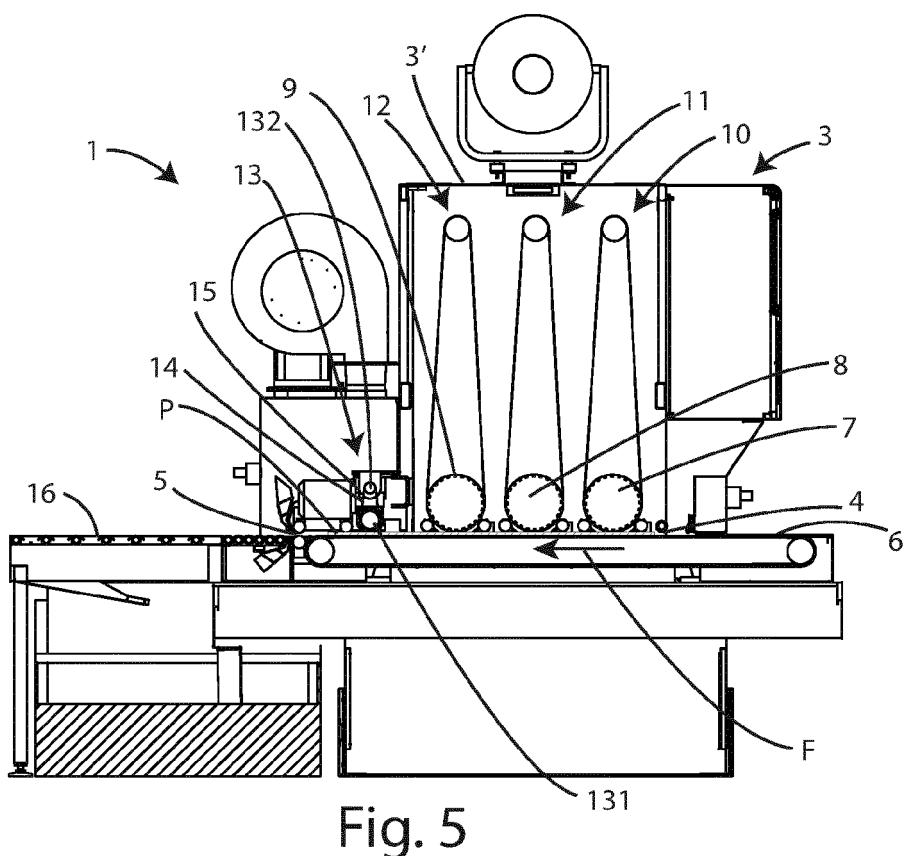
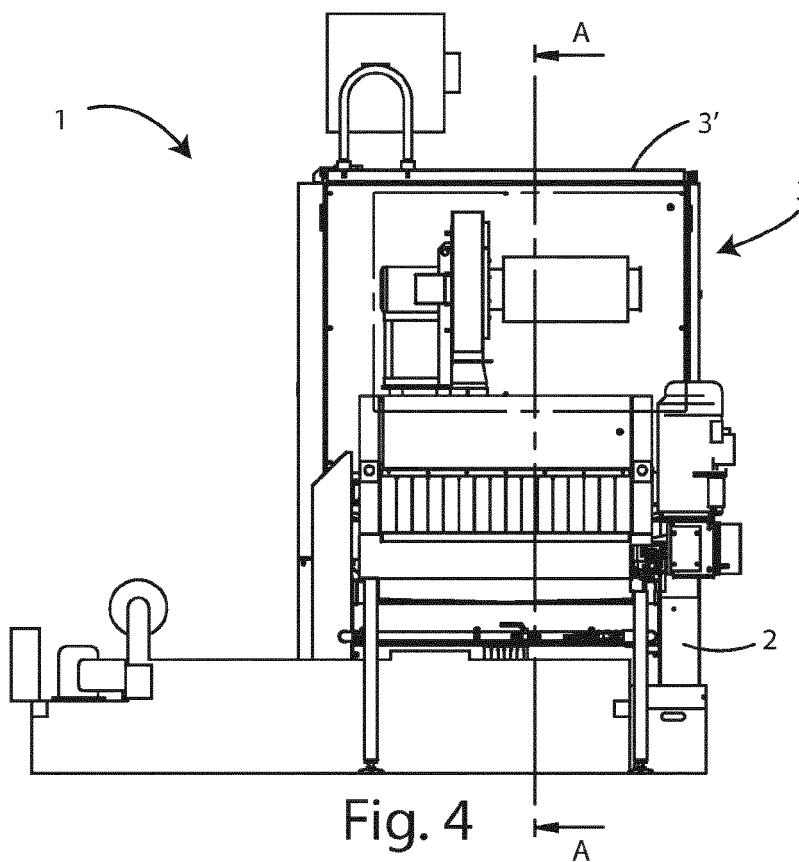


Fig. 3





EUROPEAN SEARCH REPORT

Application Number

EP 20 18 6870

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30			TECHNICAL FIELDS SEARCHED (IPC)
35			B24B B23Q B23C
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50 1	The present search report has been drawn up for all claims		
55	Place of search Munich	Date of completion of the search 16 February 2021	Examiner Koller, Stefan
CATEGORY OF CITED DOCUMENTS		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
ON EUROPEAN PATENT APPLICATION NO.

EP 20 18 6870

5 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.

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