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EUROPEAN PATENT APPLICATION

⑮ Application number: **85200174.2**

⑥ Int. Cl.⁴: **B 21 B 43/00**

⑯ Date of filing: **12.02.85**

⑳ Priority: **16.03.84 IT 8333684**

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㉑ Date of publication of application: **30.10.85**
Bulletin 85/44

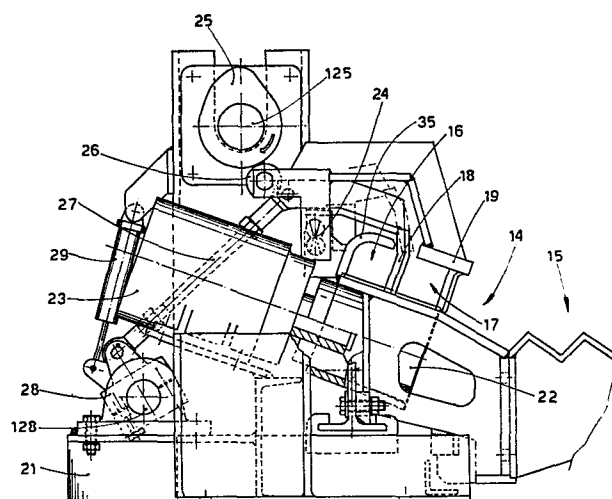
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㉒ Designated Contracting States: **AT BE CH DE FR GB LI LU NL SE**

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⑤④ **Two-channel device to brake a rolled product being fed to a cooling plate.**

⑤⑦ Two-channel device (10) to brake a rolled product (20) being fed to a cooling plate (15), the device (10) being located downstream of a unit (11) which cuts rolled products (20) to size, and comprising a powered roller conveyor (14), tail-braking means (13), two adjacent channels (16-17) with panels (19) to hold rolled products (20), means (18) to separate the two channels (16-17) momentarily, and switch means (12), in which device (10) the bottom of the two channels (16-17) is stationary, the panels (19) to hold the rolled products (20) can move substantially in a vertical direction to disengage and discharge the rolled products (20) onto the cooling plate (15), and the first channel (16) serves to receive the rolled products (20), whereas the second channel (17) serves to brake and discharge the rolled products (20), the tail-braking means (13) being positioned in correspondence with the second channel (17).



1 "TWO-CHANNEL DEVICE TO BRAKE A ROLLED PRODUCT BEING FED TO A
2 COOLING PLATE"

3 *****

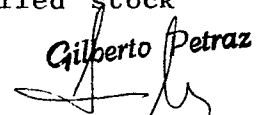
4 This invention concerns a two-channel device to brake a
5 rolled product being fed to a cooling plate. To be more exact,
6 the invention concerns a device that enables a rolled bar or
7 section which is sliding at speeds considerably higher than
8 those employed hitherto in the state of the art, to be braked
9 with regard to the feeding of the same to a cooling plate.

10 The device of the invention performs the braking of such
11 rolled product downstream from the shears which cut to size
12 the rolled products leaving a rolling train.

13 The device carries out also the discharge of such braked
14 rolled products onto the cooling plate.

15 Brake devices are known which make use of braking channels
16 cooperating with movable panels to brake and discharge a rol-
17 led product.

18 Patent GB-A-989,865 discloses a system with multiple
19 channels which is closed above by a panel. The device is of a
20 type in which the braking elements are floorplates, that is to
21 say, the rolled stock is braked by friction caused by its own
22 weight acting against the bottom of the reception channel; a
23 vertically movable floorplate can be lowered to make the rol-
24 led stock slide into the neighbouring channel, and lastly a
25 further slide floorplate serves to receive the rolled stock

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1 and to discharge it onto the cooling plate.

2 This system is complicated, particularly as regards the
3 working sequence; moreover, auxiliary means such as tail
4 brakes have not been provided to shorten the braking distance.

5 Patent DE-A-1.020.949 discloses a two-channel device in
6 which the braking takes place by sliding on the lower side, or
7 floor, of the channels. The device comprises a first set of
8 slide plates able to lift the rolled stock braked in the first
9 channel so as to make it slide onto the cooling plate; to
10 cause this, bridge elements spaced apart are provided which
11 pass over the second channel. Such bridge elements are raised
12 from below by retractable pivots so as to discharge the rolled
13 stock within the second channel onto the cooling plate; such
14 rolled stock is lifted by raisable slide plates in the same
15 way as in GB-A-989,865.

16 Patent US-A-3,236,084 discloses guide-type deviator means
17 to send the rolled stock to one or the other of two braking-
18 shearing lines with a flying shears, two identical braking
19 paths being provided.

20 The speeds of rolled product which can be employed with the
21 known devices do not exceed 16 to 20 metres per second in the
22 case of roll-formed sections such as angle bars, T-beams, etc.
23 The reason for this is that the known devices cannot brake a
24 length of rolled product cut to size and discharge it onto the
25 cooling plate before the next length of rolled product arrives
26 into the brake device itself.

27 The device of the invention enables very high speeds of a
28 rolled product entering the device to be employed. For indic-
29 ational purposes, such speeds can be of the order of 30 to 35
30 metres per second or higher.

31 In particular, the device of the invention is especially
32 advantageous in the braking of sections such as angle bars,
33 T-beams, etc. which cause the greatest restrictions of speed

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1 in the known art.

2 The working principle on which the device of the invention
3 is based envisages the employment of two channels positioned
4 parallel to each other.

5 The rolled product is delivered into the one of such chan-
6 nels which lies in a higher position. It is then discharged
7 from this higher channel into the lower channel by being dis-
8 placed sideways along the sloping surface formed by the bottom
9 of the channels themselves.

10 In a preferred embodiment the displacement of a rolled pro-
11 duct from one channel to the other is obtained by means of
12 vanes which can be lifted and which in their working position
13 support at its side a rolled product sliding in the higher
14 channel.

15 Then, these vanes, being raised or at any rate displaced
16 from their working position, enable the rolled product to de-
17 scend sideways into the lower channel. The rolled product is
18 braked there by means of a brake that acts on its tail end and
19 is of a known type, and is then discharged onto the cooling
20 plate.

21 Such discharge is performed by lifting the panels forming
22 one wall for the sliding of the rolled product positioned in
23 the second channel.

24 The vanes cited above are independent of the panels and
25 have a separate actuation system.

26 The employment of two channels enables the rolled product
27 to be transferred from the first channel to the second before
28 it is braked. In this way the first of the channels is left
29 free to accept the next length of rolled product.

30 These channels comprise at their bottom a conveyor consis-
31 ting of powered rollers of a known type to feed the lengths of
32 rolled product and to deliver them to the braking tract.

33 This braking tract, which is linked to the tail-brake, is

1 located so as to correspond with the cooling plate, which in
2 this device is of a conventional type.

3 The brake which acts on the tails of the rolled products is
4 also of a known type and employs specially shaped rollers.
5 The shape of such rollers varies to suit the type of rolled
6 product being processed.

7 According to the invention a switch is provided in the
8 initial part of the roller conveyor. In each braking cycle
9 (apart from the start of processing) this switch sends the
10 rolled product into the first of the two channels.

11 The switch is then positioned in correspondence with the
12 second channel so as to assist the passage of the rolled pro-
13 duct from the first channel to the second.

14 According to the invention, before the next length of rol-
15 led product arrives, the switch is re-positioned in corres-
16 pondence with the first of the channels.

17 In this way the movement of the switch always takes place
18 in advance, and the switch is thus pre-arranged in the direct-
19 ion in which the head of the next length of rolled product to
20 arrive is to be sent.

21 The conformation of the vanes cited earlier and, at any
22 rate, of the channel that receives the rolled product is such
23 as to obviate any lift-off or excessive displacement of small
24 sections such as flat bars and small angle irons.

25 In view of their low rigidity such sections could not be
26 suitably conveyed by a mere channel consisting of open rol-
27 lers. The structure of the channels is therefore closed.

28 However, the invention can also be employed with rolled
29 products of large cross-sections. In particular, in the case
30 of larger sections, which slide at slow speeds, as is known,
31 the device is envisaged as being used in the form of a one-
32 channel device.

33 For this purpose the preferred embodiment, to which we

1 shall refer hereinafter, envisages that the vanes are taken
2 out of action and one single channel is obtained which has the
3 size of about that of the sum of the sizes of the two parallel
4 channels.

5 When braking has been carried out either with brakes acting
6 on the tails of the rolled products or by natural braking, the
7 sections are discharged from that channel onto the cooling
8 plate by means of the raising of the panels located along the
9 side of the roller conveyor.

10 The invention envisages a first portion of the conveyor in
11 which the arriving rolled product undergoes formation of a
12 bend with a very slight curvature.

13 This curvature, which extends, as we said, along an initial
14 tract of the conveyor, has the purpose of keeping the rolled
15 product separated from the panels delimiting the one single
16 channel thus formed, up to a forward enough position in the
17 channel.

18 The conveyor has an enlarged portion, which is advantage-
19 ously positioned towards the beginning of the conveyor, for
20 the purpose of obtaining such curvature.

21 In this way, after the length of rolled product braked
22 previously has been discharged onto the cooling plate, there
23 is enough time to re-position the panels without making con-
24 tact with the next length to arrive.

25 This invention is therefore embodied with a two-channel de-
26 vice to brake a rolled product being fed to a cooling plate,
27 the device being located downstream from a unit which cuts
28 rolled products to size, and comprising a powered roller con-
29 veyor, tail-braking means, two adjacent channels with panels
30 to hold rolled products, means to separate the two channels
31 momentarily, and switch means, the device being characterized
32 in that the bottom of the two channels is stationary, the
33 panels to hold the rolled products can move substantially in a

1 vertical direction to disengage and discharge the rolled
2 products onto the cooling plate, and the first channel serves
3 to receive the rolled products, whereas the second channel
4 serves to brake and discharge the rolled products, the tail-
5 braking means being positioned in correspondence with the
6 second channel.

7 We shall describe hereinafter, as a non-restrictive exam-
8 ple, a preferred embodiment of the invention with the help of
9 the attached figures, in which:-

10 Figs.1 give a plan view of the brake device of the invention;

11 Fig.2 shows a cross-section along A-A of Fig.1;

12 Fig.3 lastly shows a cross-section along B-B of Fig.1.

13 A brake device 10 shown in Fig.1 comprises a roller con-
14 veyor 14, which includes an end tract 214 parallel and adja-
15 cent to a cooling plate 15.

16 As soon as rolled sections 20 have been braked, they are
17 discharged from this tract 214 onto the plate 15.

18 The direction of movement of the rolled products 20 is from
19 right to left in the figure.

20 At the beginning of the conveyor 14 is located a switch 12,
21 which is preceded immediately by a shears unit 11, here shown
22 diagrammatically. This shears unit 11 may consist of one or
23 two shears.

24 For instance, two flying shears 11 may be provided, one
25 being for small cross-sections moving at high speed and the
26 other being for large cross-sections moving at a slow speed.

27 In such a case the two shears can be set to work and taken
28 out of action by means of one or more movable carriages.

29 The switch 12 serves to direct the rolled product 20 into
30 the proper channel and also to control and assist the rolled
31 product 20 when the latter 20 is moving from one channel to
32 the other.

33 The task of the switch 12 will become clearer hereinafter

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1 when the method of working of the device 10 is described in
2 detail.

3 A means to brake the tails of rolled products, or tail-
4 brake, 13 of a known type can be seen near the cooling plate
5 15. In this example the tail-brake 13 is of a type with spe-
6 cially shaped rollers 30 (see Fig.3) and engages the tails of
7 the lengths of rolled product arriving near the plate 15. A
8 braking action is obtained by means of such rollers 30.

9 When the rolled product 20 has been braked, it is discharged
10 sideways onto the cooling plate 15.

11 The conveyor 14 is of a type having powered rollers and
12 comprises two channels 16 and 17 respectively. The first chan-
13 nel 16 is the channel that receives the rolled product 20,
14 whereas the second channel 17 is the actual braking channel.

15 Fig.2 shows the channels 16-17 better with a cross-section-
16 al view.

17 As can be seen, the channel 16 has an immovable wall 35
18 delimiting a substantially quadrangular space and is closed at
19 its other side with a movable vane 18.

20 The movable vane 18 is pivoted at 24 in this case by means
21 of a knife-edge type of suspension cooperating with a notch in
22 a frame 21 of the device 10.

23 Tests conducted by the present applicant have shown that
24 this type of suspension is most suitable for avoiding wear as
25 well as being the best type from constructional and economical
26 points of view.

27 The vanes 18 can be lifted by means of an actuation system
28 including a turnbuckle transmission 27, which is connected to
29 a crank 28 solidly fixed to a shaft 128.

30 Rotation of the shaft 128 is performed by actuators 29,
31 which in this case are jacks and are positioned at intervals
32 along the shaft 128.

33 As can be seen in the figure, when the vane 18 is in its

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1 working position, which is shown with full lines, the channel
2 16 is almost wholly closed.

3 This obviates any undesired sideways skidding or lifting of
4 slender rolled products 20 sliding through the channel 16.

5 The other channel 17 is delimited at its sides by the vanes
6 18 lowered in their working position and by panels 19. The
7 panels 19 too can be raised like the vanes 18.

8 Each panel 19 is moved by a drive cam 25 actuated by a
9 shaft 125.

10 The cam 25 acts on a small roller 26 of the panel 19, which
11 is pivoted on the same axis 24 as the vane 18 with an analog-
12 ous knife-edge suspension system.

13 Of course, the pivots 24 of the vane 18 and panel 19 are
14 located in different positions along the length of the device
15 10 owing to reasons of constructional order. The shaft 125
16 lies along the whole length of the device 10 and therefore has
17 as many cams 25 as there are panels 19. The simultaneous actu-
18 ation of all the panels 19 is simplified in this way.

19 As can be seen in Fig.1, a plurality of panels 19 and vanes
20 18 is present on the conveyor 14 so as to form two parallel
21 channels 16-17 with a development almost continuous along the
22 whole conveyor 14.

23 The roller conveyor 14 comprises powered rollers 22 sup-
24 ported at one end. Each roller 22 is driven by a motor 23.

25 As can be seen in Fig.2, both the vane 18 and the panel 19
26 are reinforced to obtain maximum rigidity so as to provide the
27 whole device 10 with maximum strength. This is particularly
28 important when rolled products with a large cross-section are
29 being processed.

30 Lastly, Fig.3 shows in particular the tail-brake unit 13
31 located immediately upstream from the cooling plate 15.

32 The figure also shows the roller conveyor 14, of which a
33 powered 23 roller 22 can be seen.

1 The panels 19 and vanes 18 can also be seen in a lengthwise
2 view.

3 Specially shaped rollers 30 of the tail-brake 13 have a
4 profile corresponding to that of the rolled sections to be
5 braked.

6 In this example the rollers 30 are sustained by supports
7 130 and are driven by electric motors 32 and universal joints
8 and propeller shafts 31.

9 The distance between centres of the rollers 30 can be vari-
10 ed in a known manner, suitable actuators such as jacks or equi-
11 valent means being provided but not shown in Fig.3 for reasons
12 of simplicity.

13 To take the tail-brake unit 13 thus shown out of work a
14 slider 33 is employed onto which the motors 32 and supports
15 130 are fitted.

16 As an alternative, an overturning system, for instance, can
17 be used.

18 In any event, the tail-brake 13 is of a type known in the
19 art and we shall therefore not dwell upon it further.

20 The device 10 works as follows. The switch 12 is located
21 initially at position 12A in Fig.1, that is to say, it is
22 pointed towards the second channel, or channel of panels, 17.

23 When the head of the first length of rolled product 20 ar-
24 rives, it is therefore sent into channel 17.

25 When such length has covered a greater part of the channel
26 17 in the direction of the lengthwise development of the lat-
27 ter 17, the switch 12 is moved to position 12B corresponding
28 to channel 16 before the next length of rolled product 20
29 arrives.

30 When the head of this next length arrives, it is therefore
31 introduced into channel 16 by virtue of the pre-positioning
32 12B of the switch 12.

33 At the same time the channel 17 is ready for discharge; the

1 length of rolled product 20 in the channel 17 is braked by the
2 tail-brake 13, and the panels 19 are then raised for discharge
3 of the rolled product 20 onto the plate 15.

4 In the meanwhile the head of the next length of rolled pro-
5 duct 20 has completed its whole run within the channel 16.

6 The switch 12 is now taken back to position 12A. This po-
7 sitioning of the switch 12 assists descent of the rolled
8 product 20 sideways from channel 16 into channel 17.

9 The panels 19 are lowered and the vanes 18 are raised, and
10 therefore the length of rolled product 20 in channel 16 is
11 brought by the force of gravity into channel 17. This descent
12 is assisted by the inclination of the switch 12 at position
13 12A.

14 As we said earlier, channel 17 is positioned at a lower
15 level than channel 16, the channels 16-17 having their bottoms
16 sloped sideways, and the bottoms consisting of the rollers 22
17 (see Fig.2).

18 Passage from channel 16 to channel 17 having now been car-
19 ried out, the vanes 18 are lowered once again.

20 The switch 12 is taken back to position 12B and in this way
21 the delivery of the next length of rolled product 20 to arrive
22 is pre-set for channel 16.

23 The panels 19 are lifted for the discharge of the length of
24 rolled product 20 present in channel 17 onto the plate 15. The
25 cycle is then repeated.

26 The invention enables portions of rolled product to be eli-
27 minated which have a length unsuitable for subsequent use and
28 are the last to arrive along the rolling line.

29 For this purpose it is enough to keep the vanes 18 lowered
30 and thus to prevent the last portion of rolled product arriv-
31 ing from being displaced sideways from channel 16 into channel
32 17.

33 Such portion therefore continues its run within channel 16

1 until it reaches a part 116 of that channel 16 not equipped
2 with vanes 18 (see Fig.1b).

3 That portion of rolled product is then displaced from the
4 part 116 of channel 16 to a part 117 of channel 17. The por-
5 tion is braked lastly by means of a roller conveyor 36 which
6 discharges such portions.

7 This roller conveyor 36 comprises in a known manner a
8 movable bottom 136 which can be raised to brake such portions
9 of rolled product as have to be discarded. One or more parts
10 of this movable bottom 136 can be lifted, depending on the
11 speed of such portions of rolled product. The portions thus
12 braked are butted against a final abutment 236 and are then
13 evacuated in any known way in a collection container 37.

14 Besides the method of working which has now been described
15 and which is suitable for rolled products of small cross-
16 sections travelling at high speed, this invention is suitable
17 also for use with rolled products of a large cross-section
18 travelling, therefore, at a slow speed.

19 With such latter types of rolled products the method of
20 working is as follows. The vanes 18 are lifted by the pneu-
21 matic actuators 29 so that they always remain out of action.

22 In this way the brake device 10 works as a normal brake
23 device with one single channel.

24 As the vanes 18 are no longer in their working position,
25 the channel formed by the union of the channels 16 and 17 has
26 a width great enough to receive even the biggest sections, as
27 can be seen in Fig.2.

28 As we said earlier, the part 114 of the roller conveyor 14
29 comprises a width of channel 16 greater than that in the re-
30 mainder of the conveyor 14.

31 This is due to the fact that, when large sections are being
32 processed and the vanes 18 are therefore always out of action,
33 a rolled product 20 arriving has to undergo a curvature shown

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1 in Fig.1, so as to be kept distant from the panels 19.

2 In fact, the panels 19 have to have time to be able to
3 ascend and descend so as to discharge the preceding length of
4 rolled product located on the roller conveyor 14.

5 The device 10 can work in this way with one single channel
6 and therefore possesses considerable versatility, being able
7 to serve not only thin sections moving at high speed but also
8 large sections travelling at a slow speed.



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1	<u>INDEX</u>
2	10 - brake device
3	11 - shears unit
4	12 - switch
5	12A - position of switch
6	12B - position of switch
7	13 - tail-brake
8	14 - roller conveyor
9	114 - enlarged tract
10	214 - end tract
11	15 - cooling plate
12	16 - first channel
13	116 - end part
14	17 - second channel
15	117 - end part
16	18 - vanes
17	19 - panels
18	20 - rolled product
19	21 - frame
20	22 - rollers
21	23 - motor
22	24 - pivot
23	25 - cam to drive panels
24	125 - shaft
25	26 - small roller
26	27 - turnbuckle
27	28 - crank
28	128 - shaft
29	29 - actuator or jack
30	30 - specially shaped rollers
31	130 - supports
32	31 - universal joints and propellor shafts
33	32 - motors

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- 1 33 - slider
- 2 34 - guides
- 3 35 - immovable wall
- 4 36 - roller conveyor for discharge of discarded portions
- 5 136 - movable bottom
- 6 236 - abutment
- 7 37 - collection container.

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CLAIMS

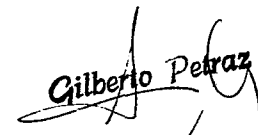
1 - Two-channel device (10) to brake a rolled product (20) being fed to a cooling plate (15), the device (10) being located downstream of a unit (11) which cuts rolled products (20) to size, and comprising a powered roller conveyor (14), tail-braking means (13), two adjacent channels (16-17) with panels (19) to hold rolled products (20), means (18) to separate the two channels (16-17) momentarily, and switch means (12), the device (10) being characterized in that the bottom of the two channels (16-17) is stationary, the panels (19) to hold the rolled products (20) can move substantially in a vertical direction to disengage and discharge the rolled products (20) onto the cooling plate (15), and the first channel (16) serves to receive the rolled products (20), whereas the second channel (17) serves to brake and discharge the rolled products (20), the tail-braking means (13) being positioned in correspondence with the second channel (17).

2 - Two-channel device (10) to brake a rolled product (20) being fed to a cooling plate (15) as claimed in Claim 1, in which the panels (19) can be raised.

3 - Two-channel device (10) to brake a rolled product (20) being fed to a cooling plate (15) as claimed in Claim 1 or 2, in which the means (18) that cause momentary separation are independent of the panels (19).

4 - Two-channel device (10) to brake a rolled product (20) being fed to a cooling plate (15) as claimed in any claim hereinbefore, in which the momentary separation means (18) comprise movable vanes (18).

5 - Two-channel device (10) to brake a rolled product (20) being fed to a cooling plate (15) as claimed in Claims 1 and 4, in which the movable vanes (18) have a working position and also a position where they are out of action.



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1 6 - Two-channel device (10) to brake a rolled product (20) be-
2 ing fed to a cooling plate (15) as claimed in any claim here-
3 inbefore, in which the roller conveyor (14) forms the bottom
4 of the two channels (16-17).

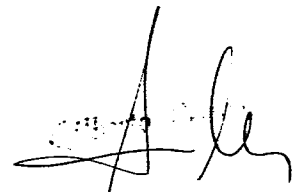
5 7 - Two-channel device (10) to brake a rolled product (20) be-
6 ing fed to a cooling plate (15) as claimed in any claim here-
7 inbefore, in which the switch means (12) have two positions
8 (12B-12A) respectively corresponding to one (16) and the other
9 (17) of the two channels (16-17) and are located upstream from
10 the two channels (16-17).

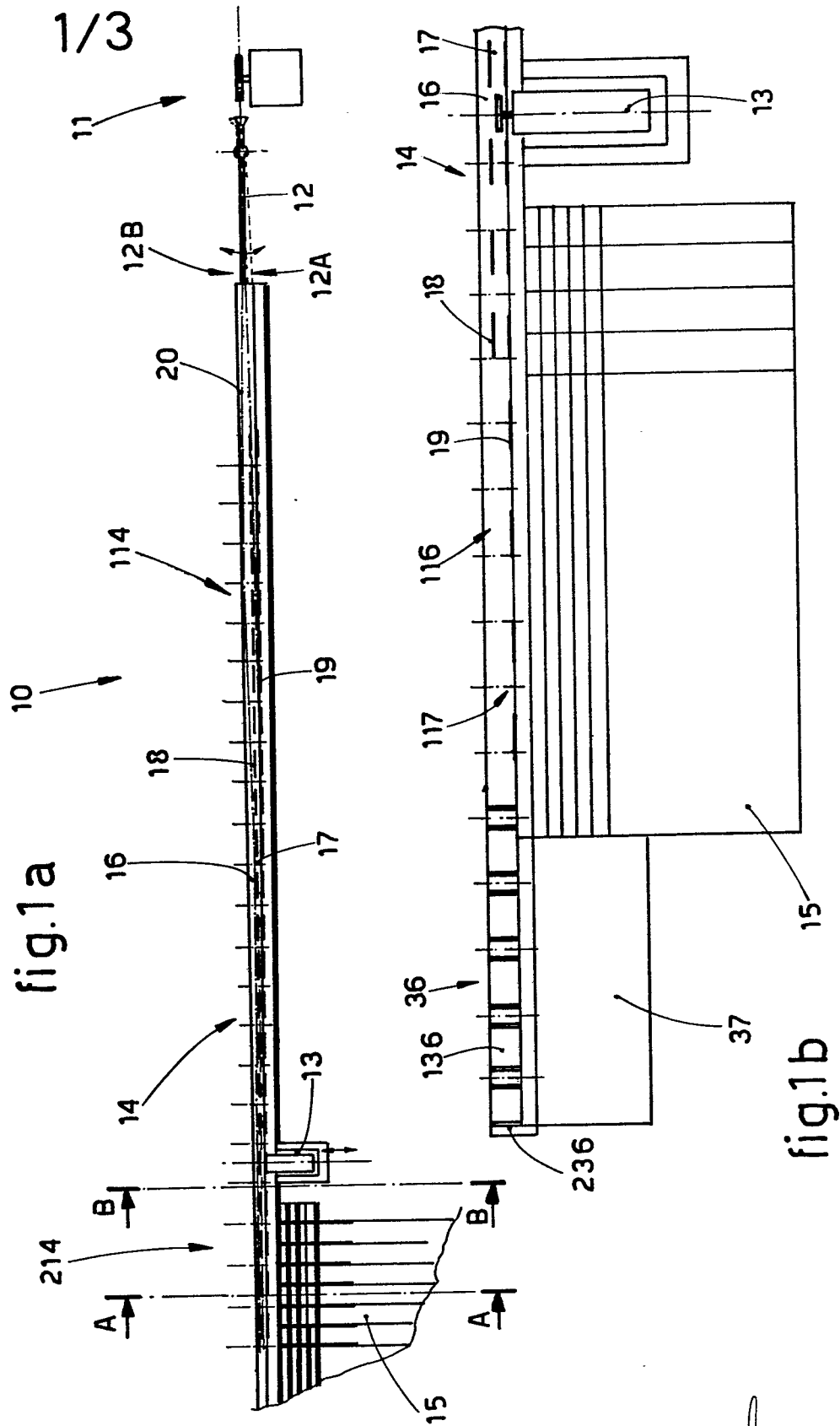
11 8 - Two-channel device (10) to brake a rolled product (20) be-
12 ing fed to a cooling plate (15) as claimed in any claim here-
13 inbefore, in which the first channel (16) has an enlarged por-
14 tion (114).

15 9 - Two-channel device (10) to brake a rolled product (20) be-
16 ing fed to a cooling plate (15) as claimed in Claims 1 and 8,
17 in which the enlarged portion (114) is located in an inter-
18 mediate position lying advantageously towards the beginning of
19 the channel (16).

20 10 - Two-channel device (10) to brake a rolled product (20)
21 being fed to a cooling plate (15) as claimed in any claim
22 hereinbefore, which comprises at its end a roller conveyor
23 (36) to brake and discharge (37) faulty portions of rolled
24 product (20).

25 11 - Two-channel device (10) to brake a rolled product (20)
26 being fed to a cooling plate (15) as claimed in Claims 1 and
27 10, in which the roller conveyor (36) performing braking and
28 discharge (37) has at least one part of its bottom (136) able
29 to move so as to brake lengths of rolled product (20).





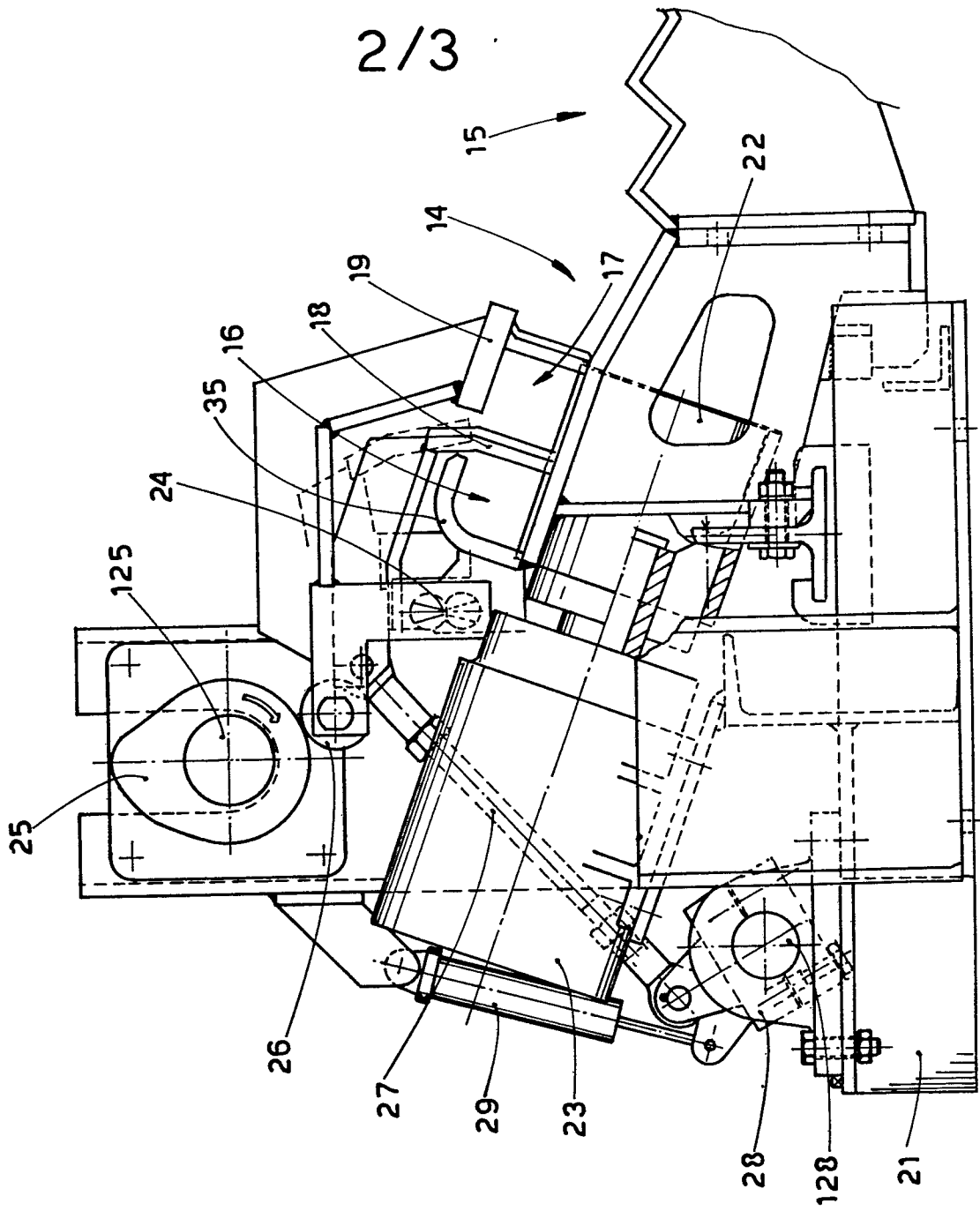


fig. 2

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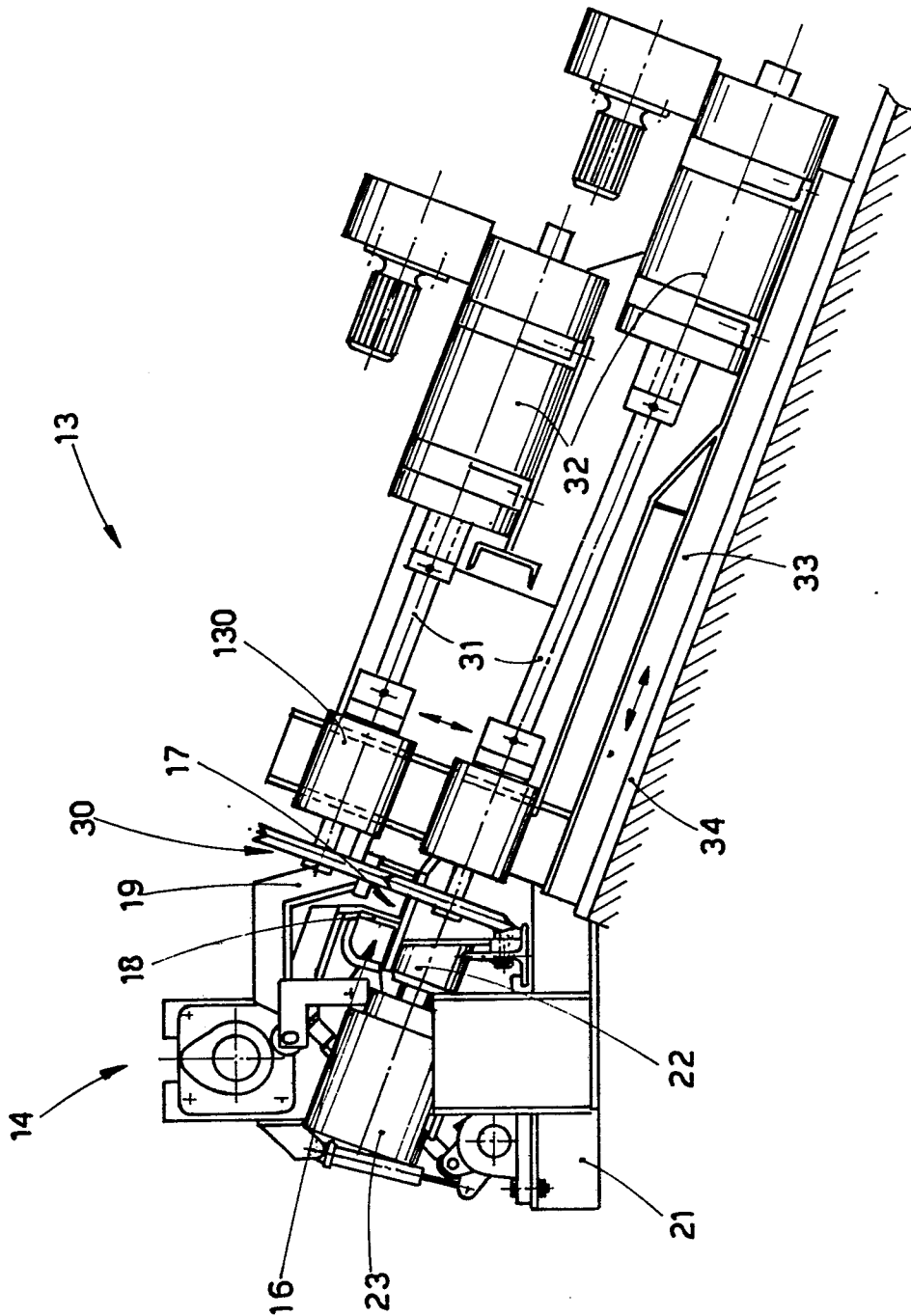


fig. 3

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0159728



European Patent
Office

EUROPEAN SEARCH REPORT

Application number

EP 85 20 0174

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.4)
D,A	GB-A- 989 865 (SCHLOEMANN AG) * Figures 1-15; pages 1-4 *	1-6	B 21 B 43/00
D,A	DE-A-1 020 949 (AUTOMATIC TELEPHONE & ELECTRIC CO. LTD.) * Figures 1,2; columns 1-4 *	1-6	
D,A	US-A-3 236 084 (HITACHI) * Figures; column 2, lines 23-27 *	1,7	
			TECHNICAL FIELDS SEARCHED (Int. Cl.4)
			B 21 B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 21-06-1985	Examiner NOESEN R.F.
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			