

OPINION UNDER SECTION 74A

Patent	EP 1877205
Proprietor(s)	INGVEST AB
Exclusive Licensee	
Requester	INGVEST AB
Observer(s)	Kingspan UK; Stam S.p.a
Date Opinion issued	20 October 2020

The request

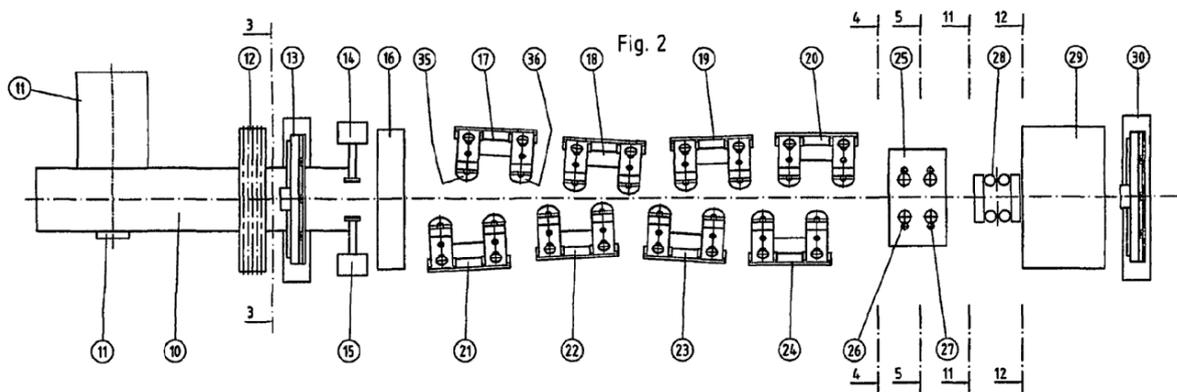
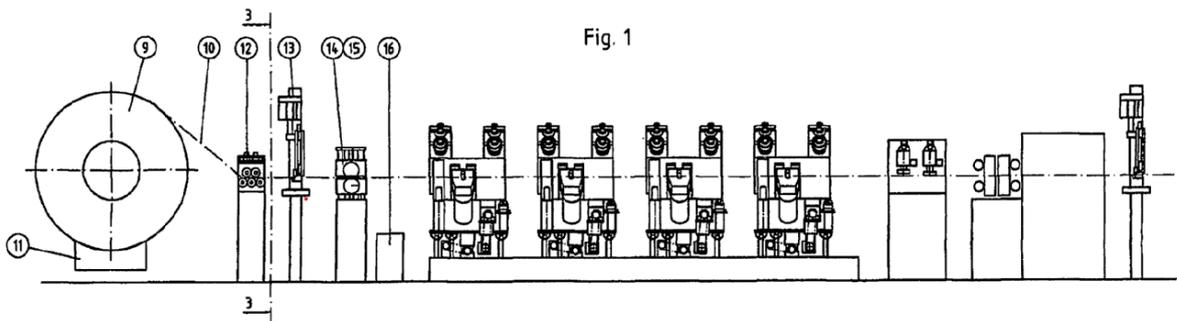
1. The comptroller has been requested to issue an opinion as to whether a machine (“the contested machine”) shown in a series of still images taken from publicly available videos would infringe EP 1877205 (“the patent”)
2. Observations have been received on behalf of Kingspan UK and of Stam S.p.a. and observations in reply on behalf of INGVEST AB, the proprietors of the patent.

Preliminary matters

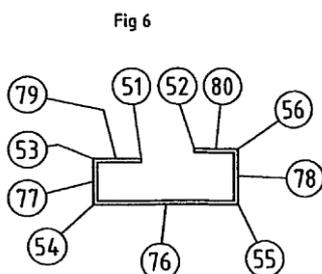
3. In their observations Kingspan UK argue that the request should be refused as frivolous since neither the contested machine nor any products obtained directly by its use have been in the United Kingdom. They also point out that no action to enforce the patent has been taken in the six years since it was granted and that the videos in question are some years old.
4. The request makes no claim that any potentially infringing acts have actually taken place. This seems entirely consistent with the wording of Rule 93(6)(a) “*whether a particular act constitutes, or (if done) would constitute, an infringement of the patent*”.
5. There seems no reason for me to suppose that the request is frivolous or vexatious irrespective of the time that has passed since the patent was granted and the videos were made available. Kingspan UK acknowledge that no enforcement action has been taken and it follows that the question has not been considered in relevant proceedings, confirmed by the proprietor and requester in their observations in reply.
6. Therefore it seems to me inappropriate to refuse the request.

The patent

7. The patent was granted with effect from 1 October 2014 and remains in force. It is entitled "A production line and a method of shaping profiles" and according to paragraph 1 the invention relates "to a production line for the continuous forming of profiles that have a variable cross-section along their lengths from a plane metal strip that is uncoiled from a tape reel ...".
8. Such a production line is illustrated in figures 1 and 2, below, and as described in paragraph 8 "contains an unwinder 11 for unwinding a metal strip 10 from a tape reel 9, a roller leveller 12 for levelling the metal strip 10, an initial stamp 13, an edge cutter station 14, 15 on each side of the strip 10, a waste mill 16 for collecting the edges of the strip that have been removed, four roll-forming units 17-20 and 21-24 on each side of the strip 10 for folding the strip into a profile, a curving station 25 that contains two curving units 26, 27 for curving the formed profile, a tube-forming unit 28 for closing the formed profile, a welding unit 29 for welding the seam of the closed profile, and a terminal cutter 30 for the final cutting of the completed profile."



9. A cross section of one profile that might be formed by such a production line is shown in figure 6:



10. The curving units 26, 27 of the curving station 25 are shown in more detail in figures 4 and 5 and 14 and 15 and described in paragraphs 18 to 25:

Fig 4

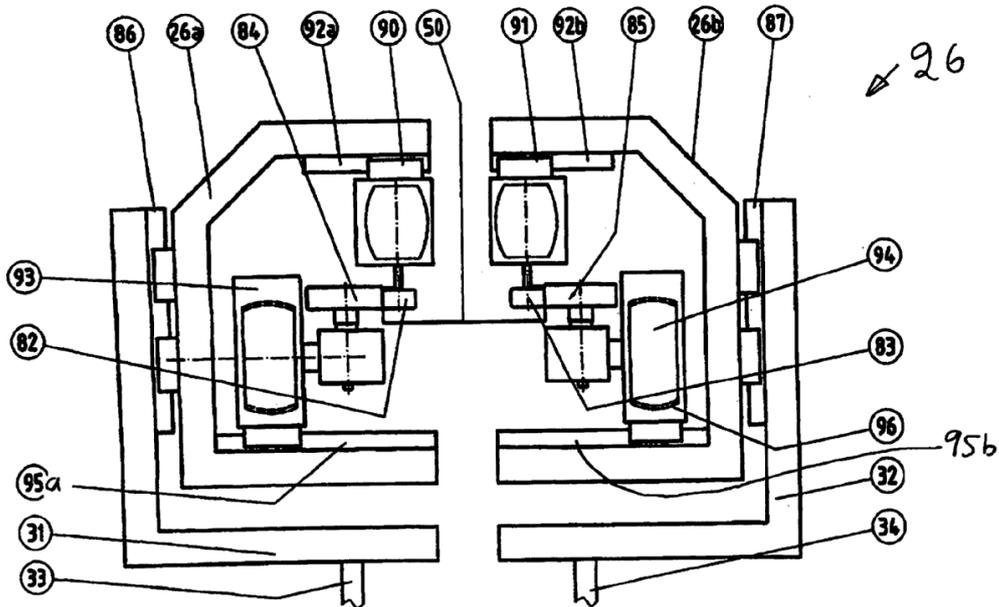
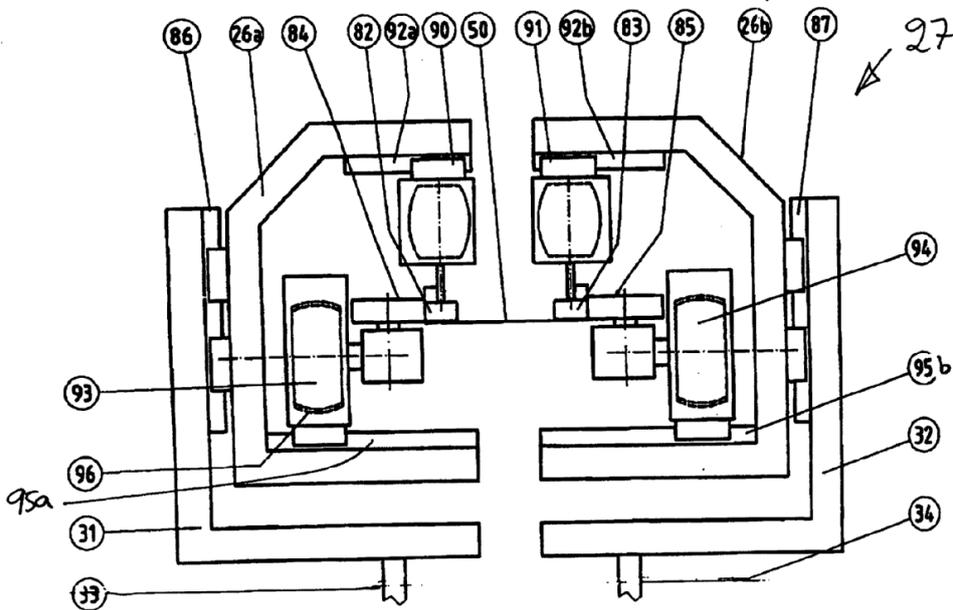


Fig 5



[0018] Figures 4 and 5 show the two curving units 26, 27 that are used when it is desired to curve or twist the profile. The profile 50 is given the same reference numbers as in Figure 6, although not all numbers are present in Figure 4.

[0019] The curving unit 26 shown as Figure 4 will be described in more detail. It consists of two separate frames 26A and 26B, each of which supports a roller pair

82, 84 and 83, 85. Each roller pair has its counter roller 82, 83 inside of the profile 50, and these counter rollers can be adjusted such that they make contact with the upper part of the side of the profile 50 that stands vertically. Rollers 84, 85 make contact on the outer surface of the wall or side. The curving unit 26 thus has one roller pair 82, 84 for one side of the profile 50, and one roller pair 83, 85 for the second side of the profile. These roller pairs are supported such that they can be independently displaced in a manner that will be described.

[0020] The frames 26A and 26B are supported by support frames 31, 32 that can be rotated to a limited extent by means of supporting axles 33, 34 supported by the frame of the machine. The frames 26A and 26B can be displaced vertically along the rails 86, 87 in the support frames 31, 32. The counter rollers are supported by units 90, 91 that can be slid in a sideways direction along the rails 92A and 92B and the rollers 84, 85 are supported by units 93, 94 that can be displaced by sliding along the rails 95A and 95B. The counter rollers and the rollers 82-85 can be adapted to the profile in that the angles at which they are positioned can be adjusted to a limited extent within the relevant unit 90, 91, 93, 94 along the partial surfaces of a circle as has been suggested with dashed lines 96, and they can be adjusted such that the gap between them is to become more narrow in order to provide a continuous thinning of the rolled metal in one direction. The various power units for carrying out the adjustment and for supplying force are not shown in the drawing. These may, for example, be hydraulic units.

[0021] The profile will be curved downwards when the rollers are pressed with a large force and with some obliqueness against the vertical sides or walls of the profile in order gradually to thin the vertical sides upwards. The rollers are supplemented with support and guide rollers located after the rollers, in order to give the profile an exact form in all three dimensions. These support and guide rollers are not shown in the figures.

[0022] The unit 27 shown in Figure 5 has a similar structure to that of the unit 26 that has been described above and is shown in Figure 4. The unit shown in Figure 5 will, therefore, not be described in detail. Equivalent items have the same reference numbers as they have in Figure 4. The rollers 84, 85 are arranged to roll the vertical sides of the profile gradually thinner against this central flange of the profile 50, such that the profile curves upwards.

[0023] In order to curve the profile in a sideways direction, the rollers of both units are used on the same side, such that the complete vertical side of one side of the profile is thinned and curves the profile in the opposite direction. In order to twist the profile, the roller of the unit 26 is used on one vertical side of the profile, while the roller of the unit 27 is used on the second vertical side of the profile.

Fig 15

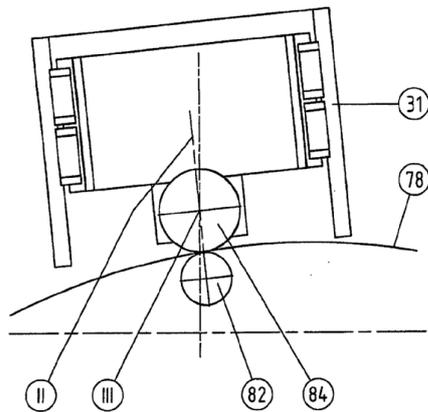
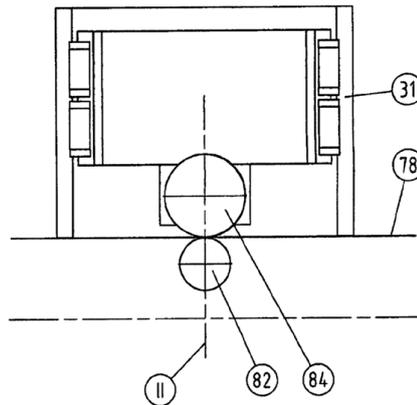


Fig 14



[0024] Figures 14 and 15 show, seen from above, one side 78 of the profile 50 in Figures 6 and 7 during the rolling operation with one of the pairs of curving rollers, the pair 82, 84. The side 78 in Figure 14 is parallel with the machine, while that in Figure 15 is shown to be curved. The support frame 31, i.e. the supporter of the roller pair 82, 84, is turned around its support axle 33, i.e. around the axis III, which is shown to go through the centre of the roller 84, such that a line II between the axes of the roller pair 82, 84 will be always perpendicular to the side 78. The turning of the support frame 31 corresponds to that of the roll-forming units.

[0025] Thus, it is possible to curve the profile in a freely chosen direction by controlling the rolling forces of the rollers 84, 85, and it is also possible to twist the profile in the desired direction. It is also possible to control all four rollers at the same time, such that the profile is both curved and twisted at the same time.

Claim construction

11. Firstly I need to construe the claims of the Patent, that is to say I must interpret it in the light of the description and drawings as instructed by Section 125(1). In doing so I must interpret the claim in context through the eyes of the person skilled in the art. Ultimately the question is what the person skilled in the art would have understood the patentee to be using the language of the claim to mean.

12. Section 125(1) of the Act states that:

For the purposes of this Act an invention for a patent for which an application has been made or for which a patent has been granted shall, unless the context otherwise requires, be taken to be that specified in a claim of the specification of the application or patent, as the case may be, as interpreted by the description and any drawings contained in that specification, and the extent of the protection conferred by a patent or application for a patent shall be determined accordingly.

13. The patent includes both method and apparatus claims, although the request relates only to method claim 1 which reads as follows:

1. A method for forming from a plane strip of metal (50) and for either curving or twisting, or both, a profile (50) with a cross-section that varies along its length, wherein

sides (77, 78) are folded up on the metal strip in a number of roll-forming units (17, 18; 21, 22) that can be displaced sideways and rotated independently of each other, characterised in

that the sides (77, 78) of the profile formed are rolled in roller pairs (82, 84; 83, 85) to become thinner at one of their edges such that the profile is curved or twisted,

that the roller pairs (82, 84; 83, 85) are supported by supports (31, 32) that can be rotated in order to allow rotation of the roller pairs such that a line (II) between the axes of the rollers in a roller pair can be held always perpendicular to the side that is being rolled, and

that the roller pairs (82, 84; 83, 85) and the sideways displacement and the angular motion of the roll-forming units (17, 18; 21, 22) are controlled by the same computer program such that the roller pairs (82, 84; 83, 85) follow the sides (77, 78) and a line (II) between the axes of the rollers in one roller pair is held always perpendicular to the side being rolled.

14. In the request the claim is discussed briefly. I will consider two of the points discussed. The first is the statement that "*The skilled person will appreciate that, in order to curve the profile, a part (for example, an edge of one of the sides) of the profile must become thinner in order to accommodate an increase in the length of that part due to the curving. For example, to curve a profile downwards, an upper edge of the profile must be made thinner to provide the increased length required around the outermost radial edge of the curve.*". This statement is in the context of the section of the claim which requires "*that the sides (77, 78) of the profile formed are rolled in roller pairs (82, 84; 83, 85) to become thinner at one of their edges such that the profile is curved or twisted*".
15. Both sets of observations take issue with this part of the request. In essence their argument is that the thinning and curving of the profile can be cause or effect, i.e. thinning of the sides at one of their edges can lead to curving of the profile or curving of the profile can cause thinning of the sides at one of their edges.
16. The requester in their observations in reply does not directly address the generality of this argument, but rather suggests that attempting to curve a profile would result in unintentional buckling and deformation of the profile and would not result in a curved profile.
17. This does not change my view of the construction of claim 1, but is relevant to the discussion of the contested machine and I will return to the point later.
18. In the method claimed it seems clear to me that thinning of the sides at one of their edges is the cause and the effect is that the profile is curved or twisted. Both the claim itself and the description lead me to this view. I note the difference between figures 4 and 5 and the related description at paragraphs 19 to 23 of the patent in which different edges of the sides are rolled and thinned in order to achieve different curving of the profile. I note the different positions of rollers 82, 83, 84 and 85 in figures 4 and 5.

19. The second point concerns “*the same computer program*” towards the end of the claim. In this respect the request says that “*The skilled person will understand that a single computer program may comprise a number of separate sub-programs, and that those sub-programs may be performed by separate machines. Thus, the skilled person will consider the requirement that the positions are orientations of the roller pairs and roll-forming units be controlled by the same program to also include circumstances in which control of roller pairs and roll-forming units is split between two (or more) notionally independent, but cooperating computer programs.*”.
20. The observations for Kingspan UK seek to place “*the same computer program*” in its broader context within the closing clause of the claim and do not seem to dispute the construction in the request that separate sub-programs and separate machines may be involved. Their point seems to be that the claim implies that the roller pairs and the roll forming units are constrained to be controlled in unison rather than completely separate machines. The observations for Stam S.p.a make much the same point.
21. In response the requester takes the view that the requirement would be understood to simply mean that the operation of the curving operation needs to be coordinated with the preceding roll-forming operation so that the curving operation can follow the profile formed by the roll-forming operation.
22. I see no reason to disagree with the requester. Whilst a production line for a continuous process is shown in the patent I believe that the skilled reader would understand that the method claimed need not be a continuous process, but would only require coordination between the various steps and those steps could be separated in both time and place.
23. The observations on behalf of Stam S.p.a. raise another issue in the claim. The sides of the profile are thinned by roller pairs, shown as 82, 83, 84 and 85 in the figures. The rollers are shown having axes of rotation parallel to one another and to the sides of the profile. I think their argument is in effect that this parallel arrangement is necessarily implied by the requirement in the claim that “*a line (II) between the axes of the rollers in a roller pair can be held always perpendicular to the side that is being rolled*”.
24. In response the requester suggests that the skilled reader would understand that the line is just one of many forming a plane perpendicular to the rolled side of the profile and that there is no requirement for the axes to be parallel. I agree with this.

The contested machine

25. The request includes screenshots from two videos said to show devices of the same type. Since there is nothing in the observations to dispute this, I will take it that the two videos do indeed show devices of the same type. Both sets of observations refer to a patent document, EP1272292, that they say shows a machine of the kind shown in the videos, albeit for curving profiles of constant cross-section rather than having a cross-section that varies. In their observations in reply the requester discusses what this patent document shows and so I take it as accepted that it shows the same operating principle as the machine in the videos.

26. The contested machine takes the form of a roll forming machine and a separate curving station or roll bending machine, as shown in figures A2.1 and A2.5 from the request, both below.
27. According to their observations Kingspan explain that:

*In A2.4 [NB figures A2.4 and A2.5 show the same image apart from the red boxes added to figure A2.5], two rollers are shown acting on a curved (convex) surface of the central base of the profile. The rollers indicated in A2.4 and A3.5 do not act alone to thin their respective sides. In the configuration shown, the rollers indicated are incapable of acting with sufficient pressure to thin **such that** the profile is curved or twisted. The rollers highlighted do not act to thin, as is suggested. The machine and the full configuration shown (rather than merely the red boxes highlighted in the Request) provides a combination of a generic pressure action (the pressure not being large enough to “thin the vertical side upwards”) to facilitate a curving or calendaring action to curve the material. In the machine, there is a longitudinal curving obtained due to a bending or calendaring action on a central base of the profile, which results from the combined action of a plurality of calendaring rollers, which act on a central portion of the profile on opposing surfaces of the profile.*

Figure A2.1

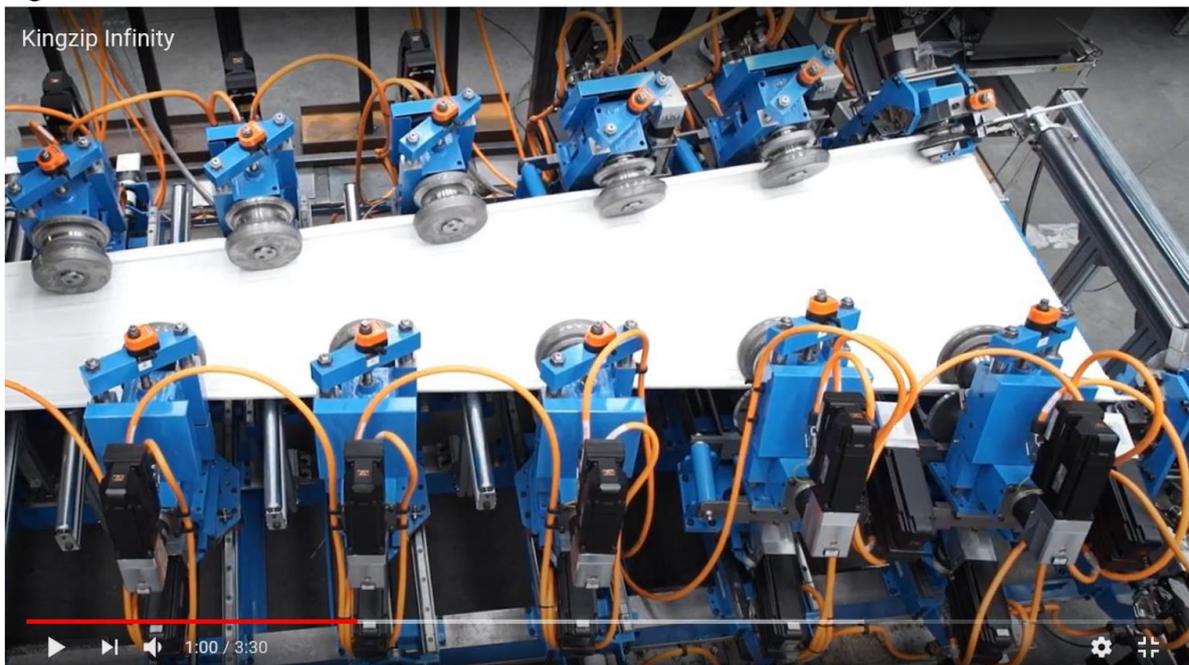


Figure A2.5

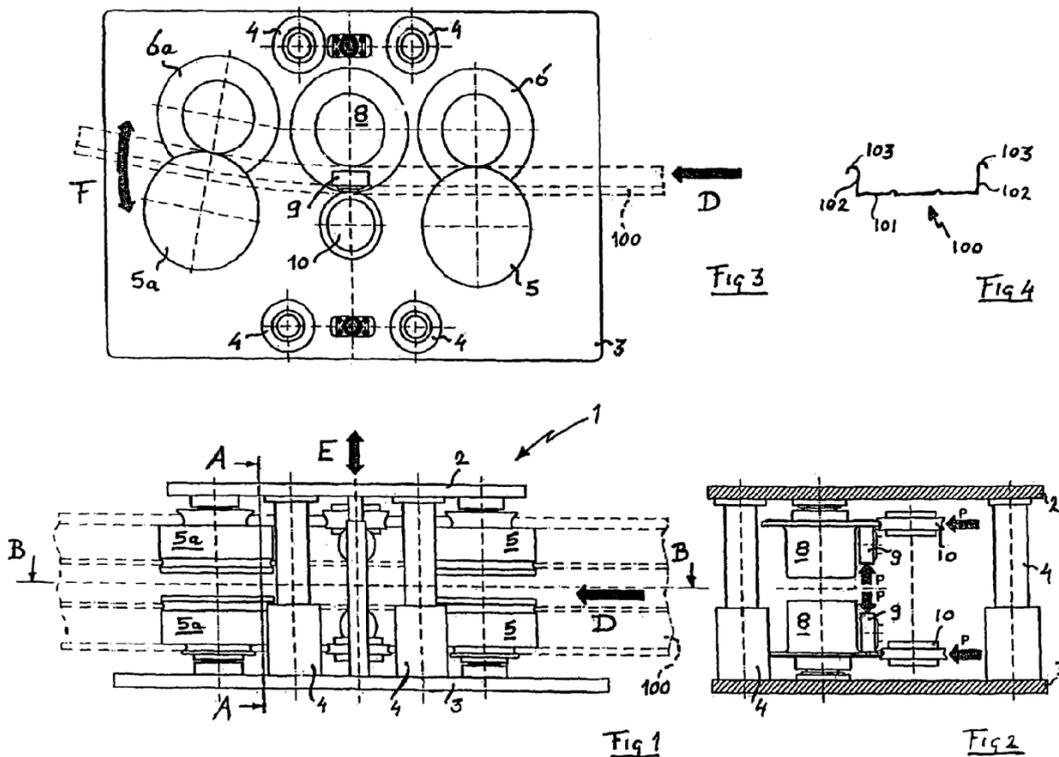


28. The curving machine of EP1272292 is shown in figures 1 to 4 below and described at paragraphs 24, 29 and 30 thus:

[0024] In between the pairs of movement rolls 5, 6; 5a, 6a pressure rolls 8, 9 and 10 are present for each flange with rim of a metal sheet 100, as is best seen in Fig. 2. An outer pressure roll 8 supports the flange 102 with rim 103 and an adjacent portion of the flat portion 101 of the metal sheet 100. (For reasons of clarity, the metal sheet is not shown in Fig. 2.) The pressure rolls 8 are rotatably attached to the top and bottom plate, respectively. The pressure rolls 9 and 10 are supported by bearing shafts (not shown), with which it is possible to press the rolls 9 and 10 against the flanges and rims of the metal sheet which is supported by the rolls 8.

[0029] A straight longitudinal metal sheet 100 with flanges 102 and rims 103 is introduced into the bending machine 1 in direction D. The front end of the metal sheet is clamped between two pair movement rolls 5, 6, which rolls transport the sheet through the machine. The front end of the metal sheet 100 is thus introduced between the pressure rolls 8, 9 and 10 on both sides of the metal sheet 100. The front end of the metal sheet is transported further until it is clamped between the two pair movement rolls 5a, 6a. Then the pressure rolls 9, 10 are pressurised to press the flanges and rims of the metal sheet against the pressure rolls 8. The amount of pressure depends on the kind of metal, the thickness of the metal sheet, the radius of the curvature that is required, and the transport velocity through the curving machine.

[0030] Due to the pressure on the flanges it is now possible to bend the flanged sheet, which is accomplished by the sideways adjustment of the movement rolls 5a, 6a. Subsequently the total length of the metal sheet that is to be curved is transported through the curving machine, during which treatment it is possible to adjust the movement rolls 5a, 6a so as to get a different radius of the curvature, when required.



29. The action of the machine is also explained in paragraphs 10, 12 and 13:

[0010] Due to the pressure on the flanges, the metal at those spots becomes more or less fluidized, as a result of which it is relatively easy to deform the metal at these spots. The flanges at the fluidized spots can then easily be lengthened or shortened, and by doing so over the full length of the sheet to be curved the sheet is curved in a convex or concave form.

[0012] With this apparatus, pressure means are provided to pressurise the flanges at opposite spots, so the metal will become more or less fluidized at those spots, and the bending means will bend the metal sheet in convex or concave direction while the transport means move the sheet relative to the apparatus. Thus, the metal sheet will be curved in a simple and fast manner. Due to the fluidisation of the metal, the metal sheet can be given a convex or concave form, as required.

[0013] Preferably, the pressure means comprise pressure rolls that are provided at both sides of each flange. By using pressure rolls, pressure can be exerted on the flanges in a simple way, and the pressure rolls can simply roll over the flanges of the sheet as the sheet is moved relative to the apparatus. The pressure rolls press on a small spot, so the pressure is high and the can be easily controlled.

30. As I mentioned above there is some disagreement between the requester and the observers as to whether attempting to curve a profile without the thinning of the edges to which the patent refers would result in unintentional buckling and deformation of the profile and would not in fact result in a curved profile.

31. Frankly I have some difficulty reaching a conclusion on the point based on the

evidence provided given that the sets of evidence appear to contradict one another. Kingspan state clearly in their observations that “*the rollers indicated are incapable of acting with sufficient pressure to thin **such that** the profile is curved or twisted*”. Whereas the requester is equally clear that “*in order to curve the profile, a part (for example, an edge of one of the sides) of the profile must become thinner in order to accommodate an increase in the length of that part due to the curving*” and that the bending action that the observers argue produces the curving effect “*would result in an uneven application of force to the sides of the profile, which would cause the profile to buckle and deform. Consequently, the end result of such a process would not be a curved profile, but rather one which has been unintentionally deformed into some other shape.*”.

32. Cautiously I suggest that it may be that both the requester and the observers are correct. I note that the arrangement shown in figures 4 and 5 of the patent has rollers 82, 83 that exert pressure only on a part of each side of the profile, thereby directly thinning only those parts and hence I am told curving or twisting the profile. Whereas the contested machine, at least insofar as it is illustrated in figures 2 and 3 of patent EP1272292, seems to exert pressure over substantially the whole of each side of the profile. Such an arrangement does not appear to be capable of directly thinning only a part of a side of the profile. Therefore it is possible that the fluidisation of the metal that I am told is produced by the pressure applied by rollers in the contested machine permits the differential thinning that the requester argues is a necessary feature of curving or twisting such a profile. The pressure applied by rollers may not however directly cause that differential thinning in the contested machine.
33. Equally it may be true that curving a profile by bending it would produce the unintentional buckling and deformation to which the requester refers, but only if there were no mechanism to mitigate the effect. Such a mechanism may be that which is employed in the curving station or roll bending machine of the contested machine.

Infringement

34. Section 60 Patents Act 1977 governs what constitutes infringement of a patent; Section 60(1)(a) and (b) in particular concerns direct infringement where the invention is a product or a process and reads:

Subject to the provision of this section, a person infringes a patent for an invention if, but only if, while the patent is in force, he does any of the following things in the United Kingdom in relation to the invention without the consent of the proprietor of the patent, that is to say -

- (a) where the invention is a product, he makes, disposes of, offers to dispose of, uses or imports the product or keeps it whether for disposal or otherwise;*
- (b) where the invention is a process, he uses the process or he offers it for use in the United Kingdom when he knows, or it is obvious to a reasonable person in the circumstances, that its use there without the consent of the proprietor would be an infringement of the patent;*
- (c) where the invention is a process, he disposes of, offers to dispose of,*

uses or imports any product obtained directly by means of that process or keeps any such product whether for disposal or otherwise.

35. In the Supreme Court in *Actavis v Eli Lilly*¹ Lord Neuberger stated that the problem of infringement is best approached by addressing two issues, each of which is to be considered through the eyes of the notional addressee of the patent in suit, i.e. the person skilled in the relevant art. Those issues are:

(i) does the variant infringe any of the claims as a matter of normal interpretation; and, if not,

(ii) does the variant nonetheless infringe because it varies from the invention in a way or ways which is or are immaterial?

36. If the answer to either issue is “yes”, there is infringement; otherwise there is not.

37. In *Actavis* the questions of Hoffmann J in *Improver Corporation v Remington Consumer Products Ltd* [1990] FSR 181, were reformulated as follows:

(i) Notwithstanding that it is not within the literal meaning of the relevant claim(s) of the patent, does the variant achieve substantially the same result in substantially the same way as the invention, i.e. the inventive concept revealed by the patent?

(ii) Would it be obvious to the person skilled in the art, reading the patent at the priority date, but knowing that the variant achieves substantially the same result as the invention, that it does so in substantially the same way as the invention?

(iii) Would such a reader of the patent have concluded that the patentee nonetheless intended that strict compliance with the literal meaning of the relevant claim(s) of the patent was an essential requirement of the invention?

38. In order to establish infringement in a case where there is no literal infringement, a patentee would have to establish that the answer to the first two questions was “yes” and that the answer to the third question was “no”.

39. Taking the requirements of the method of claim 1 in turn the videos do show a method for forming a profile with a cross-section that varies along its length from a plane strip of metal and for either curving or twisting the profile, or both. The sides are folded up on the metal strip in a number of roll-forming units that can be displaced sideways and rotated independently of each other.

40. I have concluded above that the rollers in the contested machine as illustrated by rollers 9 in figure 2 of patent EP1272292 exert pressure over substantially the whole of each side of the profile. Hence it is not the case that the sides of the profile formed are rolled in roller pairs to become thinner at one of their edges such that the profile is curved or twisted.

¹ *Actavis UK Limited and others v Eli Lilly and Company* [2017] UKSC 48

41. It seems to be accepted that in the contested machine the roller pairs are supported by supports that can be rotated in order to allow rotation of the roller pairs. I noted above the argument from Stam S.p.a. that it is not the case that the supports are such that a line between the axes of the rollers in a roller pair can be held always perpendicular to the side that is being rolled. However, as I explained above I do not agree with this and I believe that this feature is shown in the contested device.
42. The requirement that the roller pairs and the sideways displacement and the angular motion of the roll-forming units are controlled by the same computer program I have already construed as meaning that the operations need to be coordinated, but need not be continuous or performed in a single machine. Whilst there is no explicit disclosure in the videos regarding control of the contested machine, it is clear that the complex motions of the machines shown must be computer controlled and equally clear that the roll-forming and curving operations performed in the separate machines must be coordinated in the sense that the curving machine must follow the profile formed in the roll-forming machine.
43. I must conclude that there would be no infringement of the patent by the contested machine based on the literal meaning of the claims since I have come to the view that the sides of the profile formed are not rolled in roller pairs to become thinner at one of their edges such that the profile is curved or twisted.
44. That leaves the issue of whether the variation from the invention is immaterial and the three questions from *Actavis*. The first of those is does the contested machine “*achieve substantially the same result in substantially the same way as the invention, i.e. the inventive concept revealed by the patent*”? It seems to me that the contested machine does achieve substantially the same result as the invention revealed by the patent in that it roll-forms a profile and curves or twists that profile. However, it also seems to me that the contested machine does not achieve that result in substantially the same way as the invention. My conclusion is based upon the difference in the curving or twisting operation between the machine in the patent and the contested machine. In other words to my mind the thinning of the edges of the sides of the profile in the patent is not substantially the same as the bending and fluidisation in the contested machine in light of the observations and observations in reply.
45. Having answered “no” to the first question there is no need for me to consider the remaining questions and my conclusion is that the variation is material and there would be no infringement of the patent by the contested machine.

Opinion

46. In my opinion there would be no infringement of the patent by the contested machine.

Application for review

47. Under section 74B and rule 98, the proprietor may, within three months of the date of issue of this opinion, apply to the comptroller for a review of the opinion.

Karl Whitfield
Examiner

NOTE

This opinion is not based on the outcome of fully litigated proceedings. Rather, it is based on whatever material the persons requesting the opinion and filing observations have chosen to put before the Office.