

**OPINION UNDER SECTION 74A**

Patent	GB 2517536 B
Proprietor(s)	Hydra-Ring Ltd
Exclusive Licensee	
Requester	Hutchinson IP Ltd
Observer(s)	Harrison IP Ltd
Date Opinion issued	09 October 2015

**The request**

1. The comptroller has been requested by Hutchinson IP Ltd (“the requester”) to issue an opinion as to whether GB 2517536 B (“the patent”) is novel and involving of an inventive step in light of the following documents:

D1: WO 82/00877 A1 (SERCK INDUSTRIES LTD)

D2: DE 2902278 B1 (WEINHOLD)

D3: A product catalogue downloaded from the [www.kmf-bearings.de](http://www.kmf-bearings.de) website

D4: GB 748864 A (GLACIER METAL COMPANY LTD)

D5: GB 2477070 B (ACORN CAPITAL HOLDINGS LTD)

D6: “Engineering Metallurgy, Applied Physical Metallurgy”, 6<sup>th</sup> edition, R.A.Higgins, Edward Arnold 1993, ISBN 0-340-56830-5, pages 297-298

D7: EP 2282072 A1 (JTEKT CORPORATION)

D8: US 4052091 A (BOWDEN)

**Observations**

2. Observations have been received from Harrison IP Ltd (“the observer”) detailing how the claims of the patent are not anticipated by the alleged prior art filed by the requester. The observer includes a machine translation of D2. The observer also requests that I do not consider D1 and D2 as they were considered by the examiner during pre-grant prosecution of the patent.

## Observation in reply

3. The requester has provided observations in reply to counter what has been said in the observations.

## Further observations

4. In their observations the observer requested the opportunity to file further submissions should the requester clarify/amend errors contained in the request. The Opinion process is intended to be a low cost and quick service. It provides for three well defined rounds of argument i.e. the request, observations and observations in reply. Consequently no further observations by either party are allowable.

## Allowance of the request

5. The request for an opinion on the validity of the patent is allowable in part, as discussed below.
6. Rule 94 (1)(b) states that the comptroller shall not issue an opinion if the question upon which the opinion is sought appears to him to have been sufficiently considered in any relevant proceedings. In decision BLO/370/07 the hearing officer stated that:

*“It is an intrinsic part of the substantive examination process to assess the novelty and obviousness of the claims, as properly construed, in the light of the prior art. In this context “prior art” means documents cited in the search report (at least under category “X” or “Y”, which indicate possible relevance to novelty or inventive step) as well as material which has come to the examiner’s attention in some other way. I think it reasonable to suppose in general that the examiner will have done his or her job properly in the absence of indication to the contrary, and I see no reason why this assumption should not apply even if the examiner has decided not to raise objection on the basis of any citations at substantive examination.”*

7. D1 and D2 were both cited on the search report as two of five category “X” documents i.e. relevant to novelty or inventive step. The requester submits that whilst both of these documents were considered during prosecution of GB 1406534.6 (the application from which the patent was granted) they were given insufficient consideration and in particular the full extent of the disclosure of D2 was not fully appreciated by the examiner.
8. The requester does not provide any supporting evidence to the assertion that the examiner did not give sufficient consideration to either D1 or D2. On the contrary, both documents were cited as relevant to the claims in the Combined Search and Examination Report of 10 June 2014.
9. From the above I consider it reasonable to assume that the examiner has given due consideration to both D1 and D2 during the examination process. I shall therefore not consider either D1 or D2 in this opinion.

10. D3-D8 were not considered by the examiner prior to grant of the patent and were all published before the priority date of the patent. Therefore I will consider the relevance of these documents.

## The Patent

11. The patent, GB 2517536 B, is titled "A connection system". It was filed on 11<sup>th</sup> April 2014, published on 25<sup>th</sup> February 2015 and granted on 1<sup>st</sup> July 2015. The patent remains in force.
12. The patent relates a pipe joint connector, especially for use with high pressure hoses and pipes. According to the patent a problem with existing pipe joint technology is that it often requires torqueing and welding to be undertaken to ensure a reliable joint. Most of the time pipe lines fail due to a failure in pipe joints and this is usually attributed to the welding and torqueing of the joint. Furthermore the required testing of a welding joint is both costly and time consuming.
13. Another prior art system uses flexible wound metal wire to connect pipes from the exterior using an internal groove on the pipe. However, such systems use force and/or lubricant to insert the connector, which can lead to damage during the process of inserting and removing the connector, resulting in unpredictable failure. Additionally, the system is messy and costly, and removal of the connector can be difficult.
14. The invention disclosed in the patent is aimed at overcoming the above mentioned problems with the prior art by providing a pipe joint connector that reduces component costs, labour costs and further costs associated with testing, cleaning and maintenance. This is achieved by the pipe joint connector comprising a flexible elongate portion, wherein the flexible elongate portion is provided with a plurality of rotatable members. The rotatable members provide effective strength and good resistance against the pressures experienced by high pressure pipe systems. Encapsulating the rotatable members and allowing them to rotate within the connector allows the rotatable members to act as a quick connect/release mechanism.

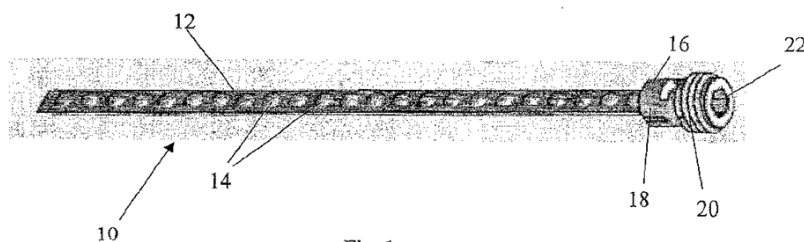


Fig. 1

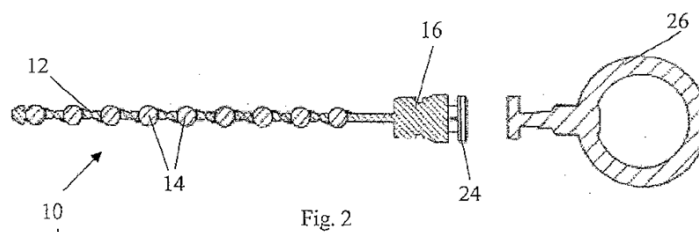


Fig. 2

15. Figures 1 and 2 above show a connector 10 comprising a flexible elongate portion 12, in which are contained rotatable members 14, in the form of metallic ball bearings. The end of the flexible elongate portion 12 is provided with a head section 16. The head section 16 comprises a connector 18 and an externally threaded fastening part 20. The fastening part is rotatable relative to the elongate portion 12 and is provided with a hex-key recess 22 for accepting a hex-key to allow the fastening part 20 to be rotated.
16. The flexible elongate portion 12 comprises a plastics material, into which rotatable members are positioned, at the same time allowing the rotatable members to rotate freely.

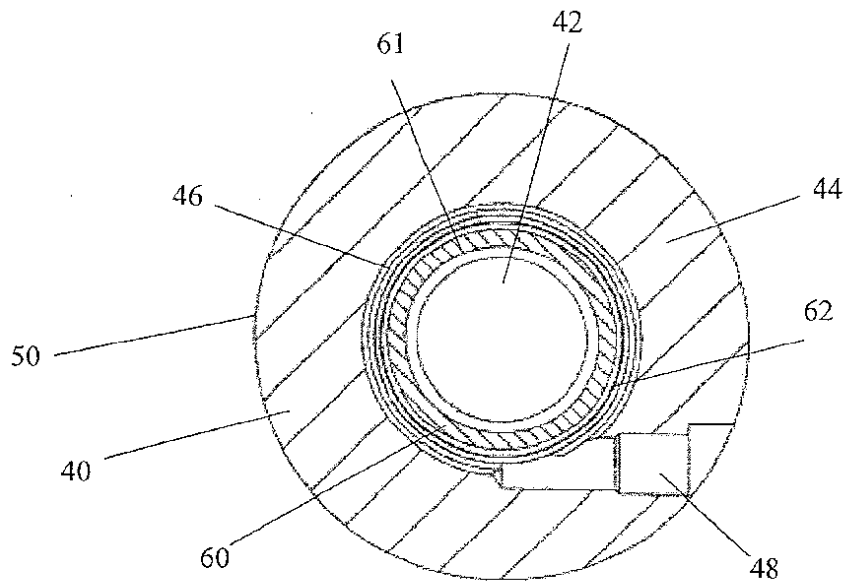


Fig. 4

17. Figure 4 shows a cross-sectional view of a pipe joint comprising a first conduit 40, which may be a pipe, tube or hose, comprising a central aperture 42 surrounded by a wall 44. The internal surface of the wall 44 is provided with a groove 46 with a profile to match the upper surface of the connector of Figure 2. The groove 46 is substantially transverse to, or lateral of, the axis of the conduit 40. The first conduit 40 is further provided with a connection aperture 48 to allow communication between the internal groove 46 and the external surface 50.
18. A second conduit 60 with an external surface of its wall 61 having a smaller diameter than the aperture 42 of the first conduit, is coaxially inserted into the first conduit 40 such that its aperture is aligned with the aperture 42 of the first conduit 40. The second conduit is provided with an external groove 62, which is shaped to match the profile of the lower surface of the connector of Figure 2.

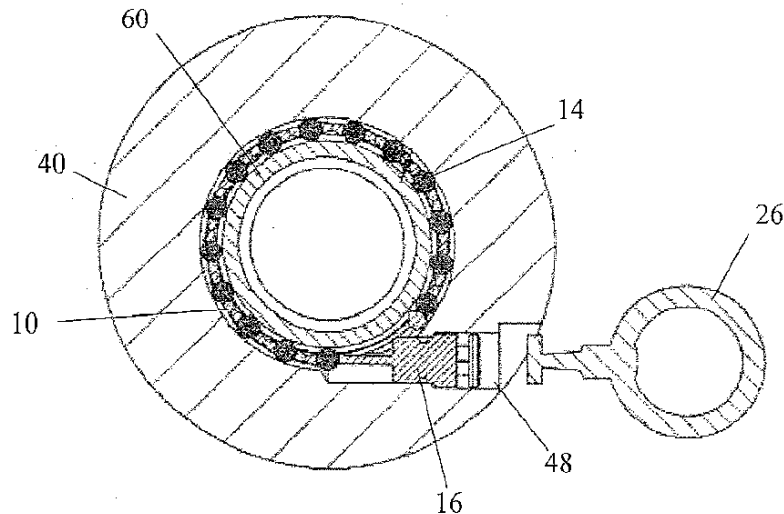


Fig. 5

19. As shown in Figure 5 above, when the second conduit 60 has been positioned within the first conduit 40, the connector 10 is inserted into the connection aperture 48. The connector 10 enters the corresponding grooves 46 and 62 and as the grooves arc round the flexible portion 12 adjusts accordingly. Additionally, the rotatable members 14 rotate as they contact the surfaces of the grooves 46 and 62 to allow the connector 10 to be easily inserted into the connection aperture 48.
20. Once the connector 10 has been fully inserted into the connection aperture 48, the grooves 46 and 62 accept at least a quarter of each of the rotatable members 14. With each rotatable member 14 being partially contained within each groove 46 and 62, the two conduits 40 and 60 become locked together and cannot be disconnected. The locking head 16 is pushed into the connection aperture 48 such that it no longer extends outside the external surface 50 of the first conduit 40.
21. The patent has eleven claims including a single independent claim. Independent claim 1 reads as follows:

*1. A pipe joint connector comprising a flexible elongate portion, wherein a plurality of rotatable members are held partially within the flexible elongate portion and protrude therefrom, and wherein the rotatable members are arranged to allow rotation about an axis that is non-parallel with the longitudinal axis of the flexible elongate portion.*

22. I shall discuss the dependent claims later on, if I find that claim 1 is invalid.

## Claim construction

23. Before considering the prior art I will need to construe the claims of the patent following the well known authority on claim construction which is *Kirin-Amgen and others v Hoechst Marion Roussel Limited and others* [2005] RPC 9. This requires that I put a purposive construction on the claims, interpret it in the light of the description and drawings as instructed by Section 125(1) and take account of the

Protocol to Article 69 of the EPC. Simply put, I must decide what a person skilled in the art would have understood the patentee to have used the language of the claim to mean.

24. 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.*

25. And the Protocol on the Interpretation of Article 69 of the EPC (which corresponds to section 125(1) ) states that:

*Article 69 should not be interpreted in the sense that the extent of the protection conferred by a European patent is to be understood as that defined by the strict, literal meaning of the wording used in the claims, the description and drawings being employed only for the purpose of resolving an ambiguity found in the claims. Neither should it be interpreted in the sense that the claims serve only as a guideline and that the actual protection conferred may extend to what, from a consideration of the description and drawings by a person skilled in the art, the patentee has contemplated. On the contrary, it is to be interpreted as defining a position between these extremes which combines a fair protection for the patentee with a reasonable degree of certainty for third parties.*

26. The claim is generally clear however there are a few parts that require a little discussion. Firstly the claim is directed to “A pipe joint connector”. This is the same as directing the claim to a connector that is suitable for use in a pipe joint. Guidance on how the scope of such claims is determined can be found in section 2.12 of the IPO’s Manual of Patent Practice which notes that that “Apparatus which otherwise possessed all of the features specified in the claims, but which would be unsuitable for the stated purpose, or which would require modification to enable it to be so used, should not normally be considered anticipating the claim”.

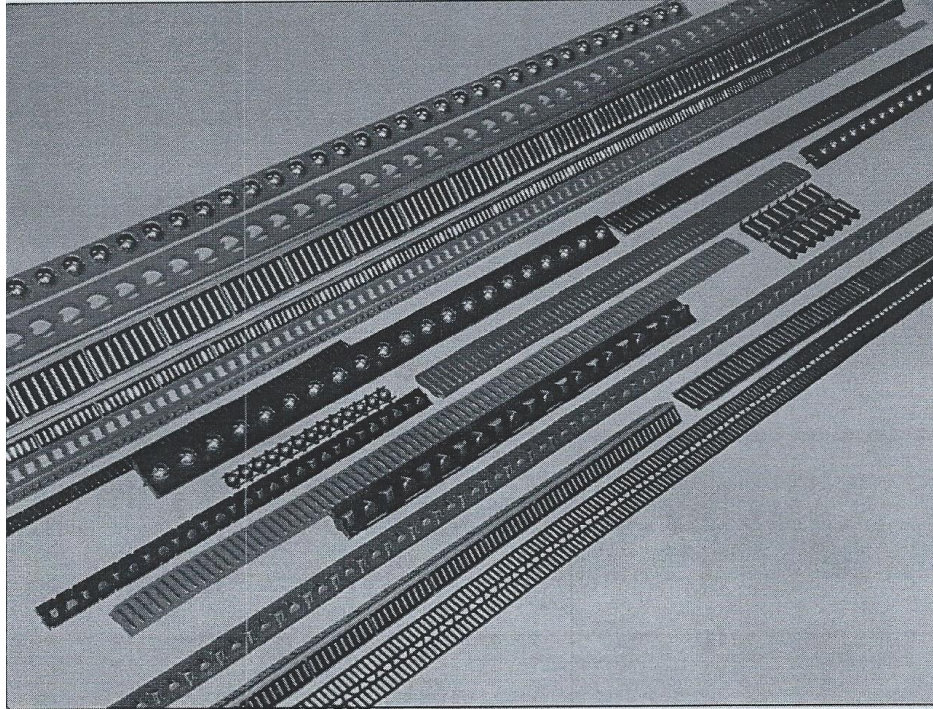
27. There was some discussion in the various observations as to whether the purpose here was such that the connector needs to be suitable for high pressure applications and for use with pipes of a relatively small diameter. The claim as it is currently worded does not in my view impose any such restrictions.

28. The only other area of disagreement was to the meaning of the requirement that the “rotatable members are held partially within the flexible elongate portion and protrude therefrom”. The requester states that the meaning of this is clear. The rotatable members are held by the flexible elongate portion and are partially located within and outside the envelope of the flexible elongate portion. The requester further argues that “partially” requires any part (however small) of the rotatable member to project beyond the envelope of the elongate portion.

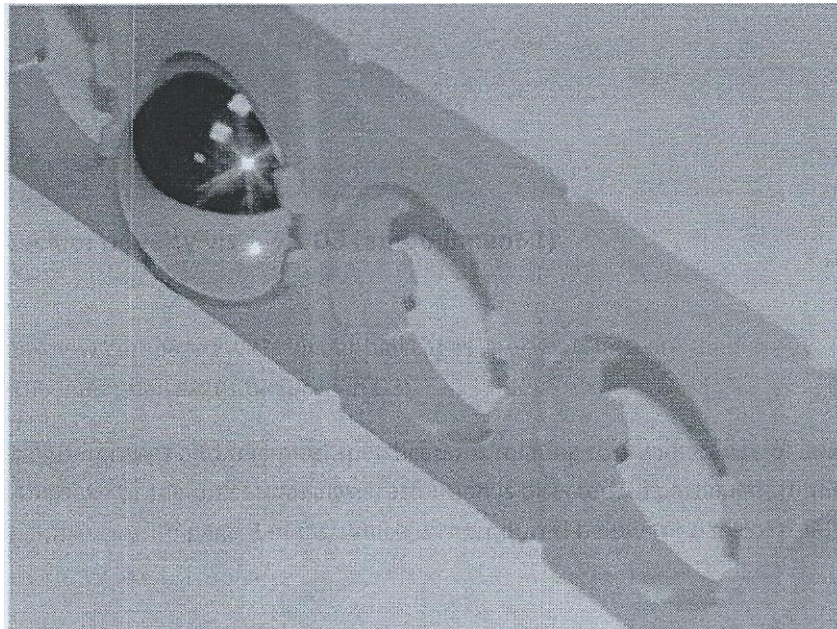
29. The observer however argues that the purpose of the rotatable members being held within the flexible elongate portion is to allow them to rotate about an axis that is non-parallel with the longitudinal axis (as in claim 1) and to allow multi-axis rotation (further defined in claim 9). This is obtained by holding the rotatable members externally of their envelope, that is, without penetrating them, as shown in the figures and associated description. The observer refers to page 5 of the description which states that the rotatable members are positioned within the flexible elongate portion, allowing them to rotate freely.
30. The requester responds to this by noting that nowhere in claim 1 is it stated or even suggested that the rotatable members are held by the flexible elongate portion without penetrating them.
31. I agree with the requester on this point. If the patentee had intended to limit the claim in the way suggested by the observer then he would not have drafted it as he did. Claim 1 requires the rotatable members to be held within the flexible elongate portion to allow them to rotate about an axis that is non-parallel with the longitudinal axis of the flexible elongate portion. Claim 1 does not require the allowance of multi-axis rotation (this feature is introduced in dependent claim 9). The rotation about an axis that is non-parallel with the longitudinal axis can be achieved by the rotatable members being held in the flexible elongate portion in a penetrative or non-penetrative manner.

## **Novelty**

32. The requester has relied upon D2, D3 and D8. As discussed above in paragraph 8 I am not considering D2 in this opinion. I will now consider the disclosure of D3 and D8 and their relevance to the claims of the patent. The requester has argued that both D3 and D8 disclose all of the features of independent claim 1.
33. Firstly I will consider D3. It is common ground that there is no mention in the document of pipes or pipe connections. However the requester argues that D3 shows linear ball cages which would be suitable for use as pipe connectors. On page 1 of D3 linear ball cages have been used particularly for track systems. The linear ball cages are said to have a positive effect on linear and rotary movement and their use for linear movement and industrial linear system manufacturers are relatively recent. The figure below shows a number of examples of linear ball cages.



34. The requester refers to a figure on page 3 of D3 shown below which shows a linear ball cage having a ball bearing contained therein. The requester points out that the linear ball cage shown “bears more than a striking resemblance” to the pipe connector shown in Fig.1 of the patent . In particular the ball bearings in the cages shown in D3 are free to rotate about an axis that is non-parallel with the longitudinal axis of the elongate portion.

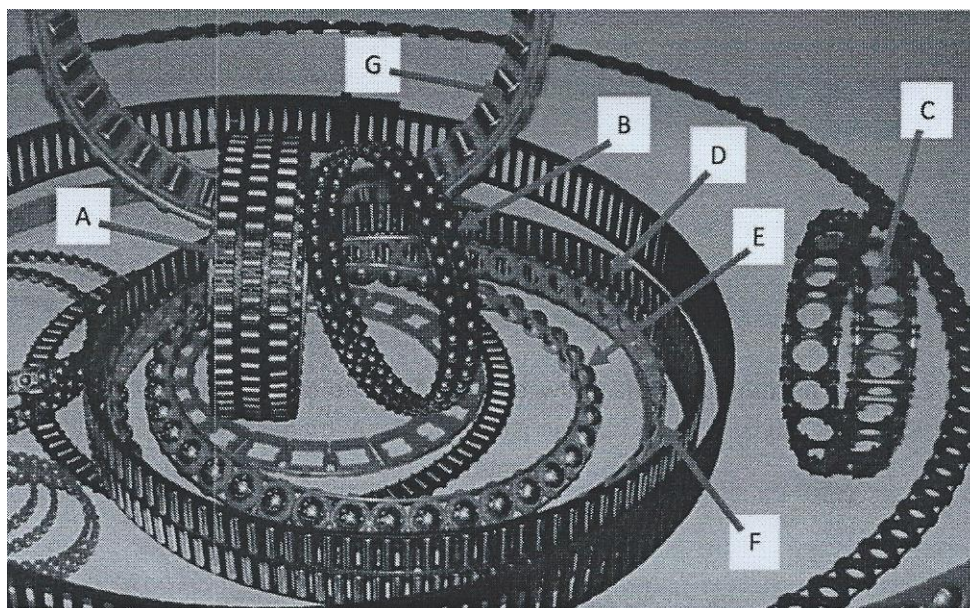
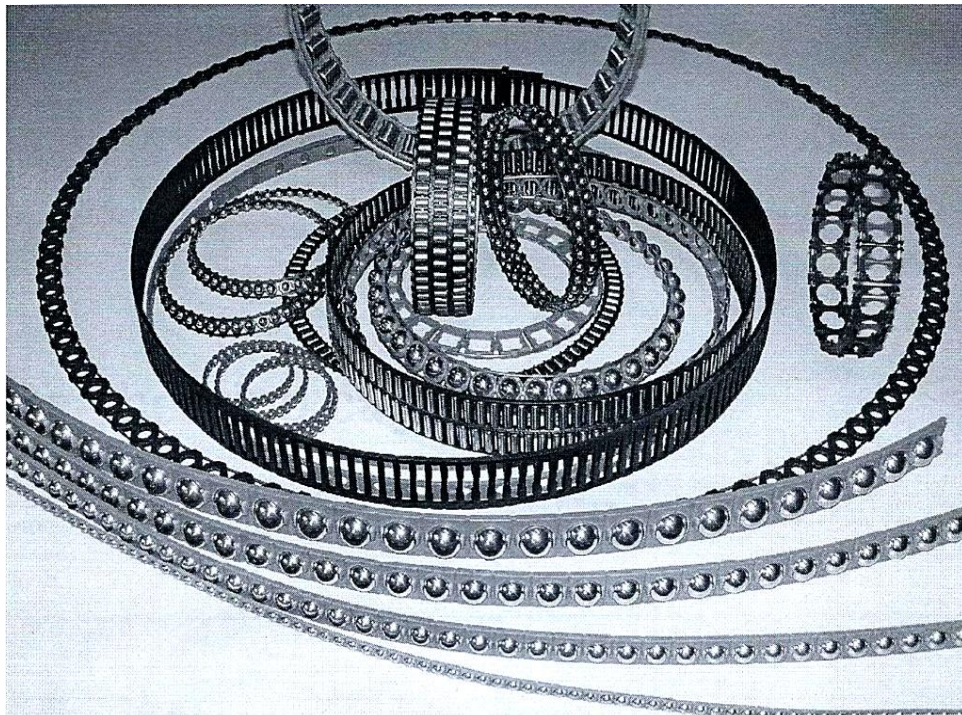


35. The requester notes that D3 discloses that the elongate portion in which the ball bearings are seated is made from injection moulded polyamide PA 12, POM or PA 12 GF30. D3 contains data on the properties of PA 12 and PA 12 GF30 and it is

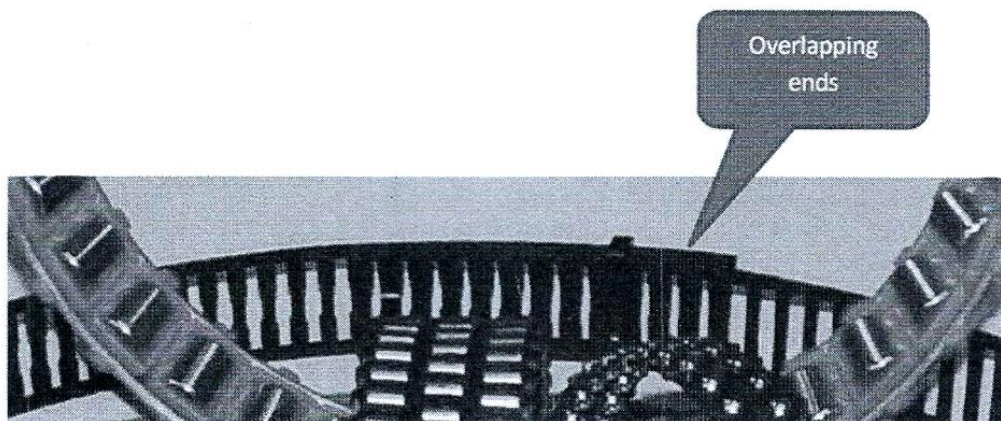
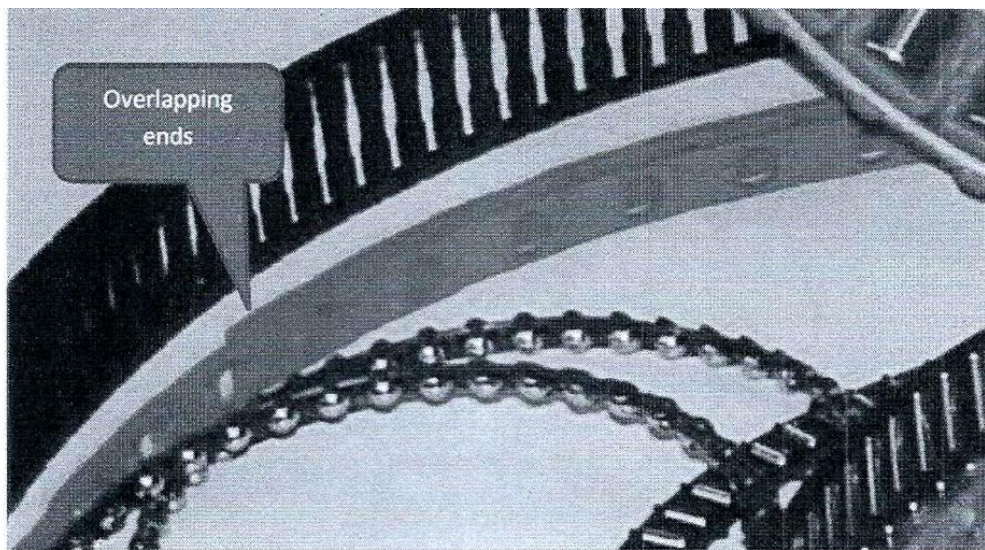


described as having high strength together with high toughness. On page 3 of D3 the elongate plastic portions are said to be individually cut to any length. The requester argues polyamide is a well known flexible material and hence the elongate plastic portion, would be sufficiently flexible to bend around the circumference of a pipe. It notes that the document discusses various means to strengthen the guides thus reinforcing its argument as to the flexibility of the un-strengthened guides

36. The requestor also notes that the cages can be bent as is clearly shown in the figure on page 30 of D3 which is reproduced below. The requester argues the figure shows embodiments A-G of other types of linear ball cages labelled as “ball bearing cages” which have been bent to form loops of a variety of diameters.



37. Furthermore an exploded view of this figure shows that some of the circular cages have overlapping ends thus suggesting that the ends prior to being joined would have been free and thus able to be inserted into a pipe fitting.

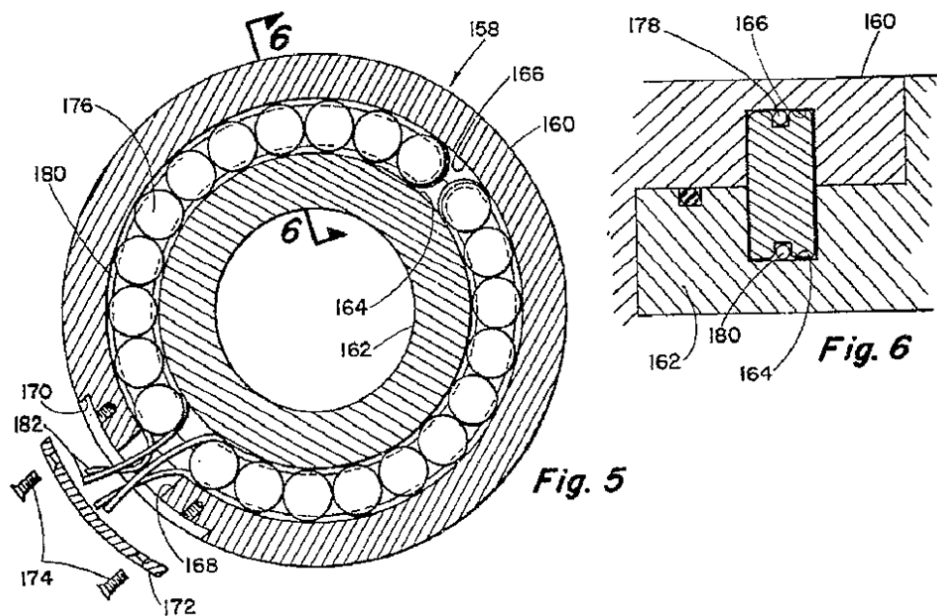


38. Therefore the requester considers D3 to disclose a device suitable for use as a pipe joint connector and having all of the features of claim 1 of the patent.
39. In contrast however the observer argues that D3 only discloses linear ball cages which are intended to be used in a linear fashion (as the name suggests) as bearings used in linear track systems. As a result the linear ball cages are not intended to be used in a curved manner and thus are not suitable for such an application as set out in claim 1. It notes that nowhere in this document is it stated that these ball cages can be bent to a radius that is sufficient for them to be employed as a pipe joint connector. It also questions the suitability of polyamide as a material for use as the elongate portion of a pipe joint connector.
40. It notes that the embodiments A-G are all closed loops and thus have no ends. Therefore they cannot be used as a pipe joint connector as they cannot be fed into an aperture of a pipe joint. The embodiments A-G would need to be cut or otherwise modified to make them suitable for the purpose of claim 1.

41. So what can I conclude about D3? As I have noted, nowhere in D3 is it explicitly disclosed that the linear ball cages can be used as pipe joint connectors. Therefore the question is are the linear cages “suitable for such a use” and do they possess all the other features of claim 1?. The linear ball cages do have an elongate portion made from polyamide wherein ball bearings are located in the elongate portion. The ball bearings are held partially within the elongate portion and protrude there from, and they are arranged to allow rotation about an axis that is non-parallel with the longitudinal axis of the flexible elongate portion.
42. As I have construed the claim, there is no requirement that the connector has to be able to operate at a particular pressure or temperature or that it needs to be able to be used with pipes of a particular diameter. Hence the only feature that is in question is whether the linear ball cages in D3 are flexible enough to enable them to be threaded around a pipe.
43. Had the requestor provided evidence of one of these ball cages from D3 being inserted around an opening in a pipe fitting to connect the pipe then that would have shown that the claim was anticipated. It has not done that but instead relied on the alleged properties of the material and figures showing circular ball cages. In respect of the latter however I note that page 30 of D3 as shown below is actually a page at the end of the catalogue showing nine product catalogues available from KMF. As can be seen D3 itself appears in the lower left with the figure relied upon being the front page of a different catalogue titled “Ball bearing cages” in the top left. The two catalogues have different publication codes “LLK 100 E” and “WLK 100 E”. In my opinion the figure from the front page of a different catalogue is not evidence that the circular ball cages in this document are necessarily made from the same material as the straight cages set out in the body of D3. Hence it is not clear whether the straight cages made from polyamide in the body of D3 can be bent as required by the claim.



44. Hence I do not consider D3 to clearly and unambiguously disclose all the features of claim 1 of the patent.
45. I will now consider D8. D8 discloses three embodiments of a locking system for a pipe joint.
46. In the first embodiment, loose circular disc members are fed into a channel formed by aligned grooves in parts to be connected. The observer argues the disc members are loose and therefore, this embodiment does not anticipate claim 1 because the discs are not within a flexible elongate portion. In their observations in reply the requester has accepted this argument and I agree that the first embodiment does not anticipate claim 1.
47. In the second embodiment the circular disc members are provided with an edge-to-edge bore and fed onto a wire. The observer states that as the disc members are threaded onto a wire, they are not "held partially within" the width of the elongate portion (the wire). The observer further adds that if they rotate, which is not explicitly disclosed in D8, they would rotate about the wire in an axis parallel with the longitudinal axis of the flexible elongate portion. Therefore the second embodiment does not anticipate claim 1. In their observations in reply the requester has accepted this argument and I agree that the second embodiment does not anticipate claim 1.
48. The requester in the initial request focussed on the third of these embodiments as allegedly anticipating claim 1 of the patent. In my opinion the third embodiment is the closest of the three embodiments to claim 1 of the patent. The third embodiment is shown below with reference to figures 5 and 6 of D8. A plurality of disc members 176 are provided within the annular chamber formed between the grooves 164 and 166, wherein each disc member 176 is provided with an annular groove 178 around the outer periphery thereof.
49. In this embodiment the disc members 176 are divided into two groups as shown in FIG. 5, each group being provided with a flexible line such as cord or flexible metal wire 180 around the outer periphery of the entire group, said cord or wire 180 having ends 182 terminating in or about the slot aperture 168.
50. In operation when it is desirable to connect the end segments 160 and 162, segment 162 is inserted within the sleeve member 160 until the respective grooves 164 and 166 are in alignment, thereby forming an annular channel therein. One group of disc members are then inserted through the slot into the annular chamber, each group having a flexible line 180 there around. The first group is pushed halfway around the annular chamber and the second group is inserted, it also being surrounded by flexible line 180 until it is in substantial contact with the first disc inserted in the first group. When it is desired to uncouple the joint, the retainer plates 172 are removed from the sleeve 160 and the groups of discs 176 are removed by simply pulling said disc out by means of the flexible lines 180.



51. The requester argues that D8 discloses a pipe joint connector comprising a flexible elongate portion (wire 180), wherein a plurality of rotatable members (circular discs 176) are held partially within the flexible elongate portion and protrude therefrom (seen clearly in Fig.6 which shows left and right portions extending sideward from opposite sides of the wire), and wherein the rotatable members are arranged to allow rotation about an axis that is non-parallel with the longitudinal axis of the flexible elongate portion (their axis of rotation is perpendicular to the longitudinal axis of the wire). The requester also draws attention to a part of the summary of invention which reads “These disc members due to their circular shape may be easily inserted into the annular chamber since they may be rolled into place like the aforementioned ball members.”
52. The observer disagrees with the requester’s interpretation of the disclosure of D8. The observer argues that figure 6 shows the wire 180 extending to touch the internal surfaces of the annular groove 178. Therefore, rather than allowing rotation of the circular discs, the wire actually prevents it. The observer also draws attention to the summary of invention, however to a different part to the requester, which reads “Two other embodiments of the present invention teach the use of connecting adjacent circular disc members by a flexible line or wire whereby after insertion into the annular chamber said disc members may be easily removed since they are connected together in an edge-to-edge relationship. However, it is pointed out that in this arrangement said disc members cannot be rolled in place thereby requiring sliding around the annular chamber which is more difficult in installation.”
53. In their observations in reply the requester argues that the disc members are not fed onto the wire, but have peripheral grooves in which the wire is seated. The wire comprises two strands which wrap in a serpentine fashion around the discs. Thus the wires do not prevent rotation of the discs and the circular shape of the disc members allows the discs to be rolled into place.

54. I agree with the observer that D8 does not anticipate claim 1 of the patent. The summary of invention clearly sets out that in the embodiments in which the circular discs are connected using flexible line or wire the disc members cannot be rolled into place. Furthermore I can find no disclosure in D8 of the wire comprising two strands which wrap in a serpentine fashion around the discs as argued by the requester. As can be seen from figure 5 above the wire extends around the outside of each disc without passing in between adjacent discs. Therefore D8 does not disclose the rotatable members being arranged to allow rotation about an axis that is non-parallel with the longitudinal axis of the flexible elongate portion as required by claim 1 of the patent.

## **Inventive step**

55. I will now consider whether claim 1 is inventive in light of the disclosure in D3 and D8.

56. In the UK the law to determine whether or not an invention defined in a particular claim is inventive over the prior art and that which I must follow is set out in *Pozzoli SPA v BDMO SA [2007] EWCA Civ 588*, in which the well known Windsurfing steps were reformulated:

- (1)(a) Identify the notional "person skilled in the art";*
- (1)(b) Identify the relevant common general knowledge of that person;*
- (2) Identify the inventive concept of the claim in question or if that cannot readily be done, construe it;*
- (3) Identify what, if any, differences exist between the matter cited as forming part of the "state of the art" and the inventive concept of the claim or the claim as construed;*
- (4) Viewed without any knowledge of the alleged invention as claimed, determine whether those differences constitute steps which would have been obvious to the person skilled in the art.*

57. There is disagreement on the definition of the skilled person. The requester defines the skilled person quite broadly as a person skilled in engineering in general, albeit with an "oil and gas bent". The requester considers this skilled person to be well-versed in general engineering principles and manufacturing principles. I consider this definition to be too broad. To define the skilled person in this way would be to consider that in any engineering field the skilled person is merely an engineer in general and would thus consider prior art from any other engineering field irrespective of how closely linked to the field of the invention.

58. The observer defines the skilled person as an unimaginative pipe joint designer possessing common general knowledge of, and being aware of, the basic technologies involved in joining pipes and hoses. As such, the skilled person has knowledge of systems and mechanisms employed in the connection of pipes and pipe joints. The requester argues that this definition is too narrow and I agree.

59. In my opinion the person skilled in the art is a person skilled in the art of designing, producing and installing pipe systems and their components including pipe joint connectors. In that role his/her common general knowledge would include the

materials used in and the operating conditions/parameters of known pipe systems and the components used therein including pipe joint connectors. Further I agree with the requester that the skilled person would have as part of his/her common general knowledge general engineering principles and manufacturing principles.

60. I agree with the requester that the underlying problem to be overcome is how to insert, and subsequently remove, the rotatable members from the pipe joint. This is achieved by the inventive concept outlined by the observer of a pipe joint connector comprising rotatable members held at least partially with a flexible elongate portion to enable the pipe joint connector to roll into a connection channel and hold two pipes together accordingly.
61. The main difference between D3 and the inventive concept is that D3 relates to a different field and not to pipe joint connectors or even pipe systems in general. D3 relates to linear ball cages for use in linear track systems. Would the skilled person as defined in paragraph 62 above have the disclosure of D3 as part of his/her common general knowledge? In my opinion the answer is no. I do not consider the disclosure of D3 to form part of general engineering principles. Would the same skilled person consider looking to the field of linear track systems in an attempt to find a solution to the problem of inserting and removing rotatable members into a pipe joint? Again in my opinion the answer is no as the two fields are quite distinct from one another. Thus I do not consider claim 1 to be obvious in light of D3.
62. The differences between D8 and the inventive concept is that D8 discloses three embodiments for connecting pipes as discussed above under novelty of which none contain rotatable members held at least partially with a flexible elongate portion to enable the pipe joint connector to roll into a connection channel. The only embodiment showing rotatable members is the first embodiment using the loose circular discs. The problem of inserting and removing the loose circular discs is solved by D8 itself in the second and third embodiments using a connecting wire through central bores in the disc or running a wire around the outside of the discs where the wire is located to an annular groove formed in the disc. The skilled person would have no motivation to look elsewhere for a solution to the problem of inserting and removing the loose circular discs. Furthermore to replace the wire of the second or third embodiment with the flexible elongate portion of claim 1 of the patent is not obvious and would in my opinion only be done with the benefit of hindsight. Thus I do not consider claim 1 to be obvious in light of D8.
63. Documents 4-7 have been used by the requester to form combined inventive step arguments in combination with D3 against claim 1 and a number of the dependent claims. As discussed above in paragraph 64 in my opinion the skilled person would not consider D3 and thus would not consider any combination including D3 to be obvious.

## **Conclusion**

64. I am therefore of the opinion that the claims of the patent are both novel and inventive over the prior art.

Marc Collins  
Examiner

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## **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.*