

OPINION UNDER SECTION 74A

Patent	GB 2340242
Proprietor(s)	Newall Measurement Systems Limited
Exclusive Licensee	
Requester	Mr Laurence Ross Petrie, on 30 April 2007
Observer(s)	Newall Measurement Systems Limited
Date Opinion issued	30 July 2007

The Request

1. The Comptroller has been requested by Laurence Petrie to issue an opinion regarding whether patent number GB2340242 (“the patent”) is infringed by position detectors that he manufactures. The patent is owned by a company called Newall Measurement Systems Limited, (“Newall”) and Mr Petrie has also requested, for reasons which will become apparent, that the Opinion consider infringement of the patent by Newall’s own products. The request was accompanied by various exhibits.

Observations

2. Observations have been filed by Newall. These include a statement rebutting the requester’s arguments and also various exhibits.

Observations in Reply

3. Observations in reply have been filed by Mr Petrie.

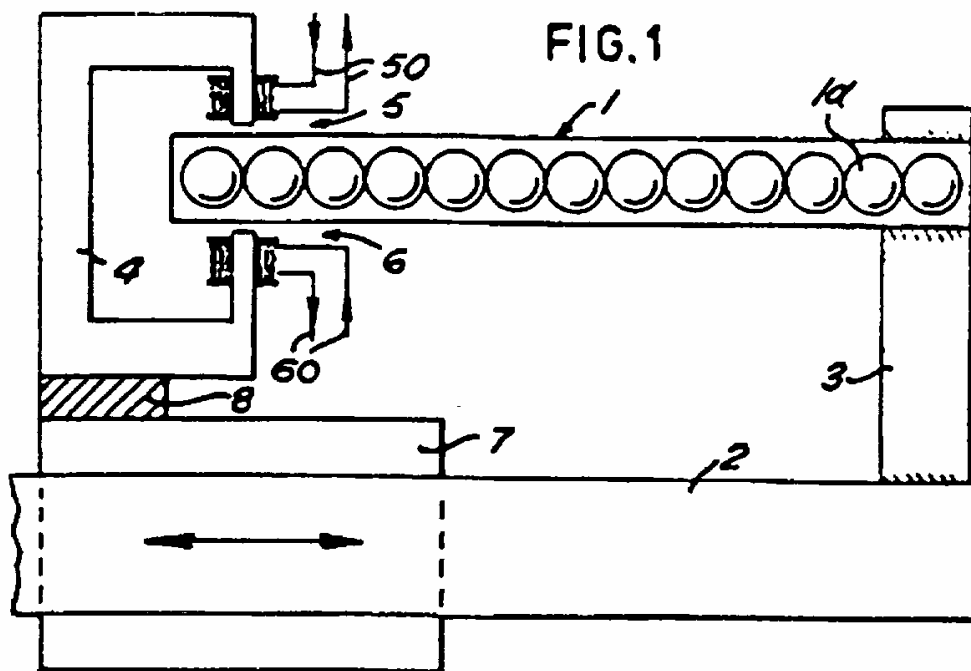
The Issues

The technology

4. The patent was filed on 28th July 1998 and was granted on 25th September 2002. It relates to a position detector for measuring relative movement

and/or displacement of two members. Referenced to the drawing below, this is achieved by housing a set of ferromagnetic balls (1a) in a line in point contact, the housing being connected to a first member (2), and placing one or more pick-up coils (5,6) about the line of balls, the pick-up(s) being connected to a second member (7). Relative movement of the first and second members then causes a signal from the pick-up coils to vary according to whether the pick-up field passes through the whole of the diameter of the ball or less than the whole diameter in an intermediate position. Although only a single set of pick-up coils is shown in the drawing, there will typically be several sets of pick-up coils.

5. Such position detectors are apparently particularly used in machine tools for very accurate measurement of the displacement of the tool or other parts. In both the requester's and the observer's submissions the position detectors are referred to as "encoders". Although these terms are apparently synonymous in the art, to avoid confusion I shall refer to them only as position detectors.
6. As the specification points out, the patent is an improvement in the position detector set out in an earlier patent GB1513567, which expired in 1996. GB1513567 essentially relates to the basic construction set out in paragraph 4 above. The improvement in the newer patent to which this opinion relates is a particular relationship between the diameter of the balls and the spacing between the pick-up coils and the line of contact of the balls.



7. Mr Petrie realises that the patent which is the subject of the opinion is effective in the UK, but he operates in Australia and has refrained in the past from importing into the UK in view of his understanding that the patent prevents him from doing so. He says he has attempted to obtain a license but this has been declined by the proprietor.
8. Mr Petrie's product is the Digiball position detector. He says in paragraph 8 of the request that the Digiball "works on identical principles to a similar range of encoder products manufactured by Newall and both makes are interoperable and largely interchangeable with each other".
9. The Newall products referred to specifically in the request are the Spherosyn and Microsyn position detectors. The observations challenge whether the Digiball and Newall position detectors are in practice interoperable and largely interchangeable with each other as contended by Mr Petrie. In support the observer gives various technical details in which they say the Digiball and Newall encoders differ.

Infringement by Newall's own products

10. Mr Petrie wants to know whether his product, the Digiball, would infringe the patent, but he has not supplied details of his own products. Instead he has taken Newall products and has disassembled them, so providing information about those, on the basis that his own products and the Newall products are the same. This presents difficulties because there is no real

evidence that they are in fact the same and indeed Petrie tells us in paragraph 51 that the Digiball is smaller than the Spherosyn detector.

11. Newall point out that they cannot by definition “make, dispose of or use products according to the patent without consent” as is required by the provision of the Act relating to infringement and therefore any position detector manufactured by them cannot infringe the patent.
12. That being the case, I do not think it is appropriate for me to give an opinion as to whether Newall’s products do or do not “infringe” their own claim. I will therefore decline to do so, but will confine my assessment solely to Mr Petrie’s products.
13. In paragraph 5.2 of the observations the observer submits that no opinion can be formed in relation to the Digiball products either, because of the lack of information provided by the requester, and therefore that I should also refuse to give an opinion as regard the Digiball. I disagree because the requester has admitted that the Digiball products have the features claimed in GB1513567, i.e. the basic construction of balls and coils as specified in claim 1 of that earlier patent. In table VI he has also furnished details of the dimensional relationship between the pick up spacing and the ball diameter. Although I could certainly wish for more information to make my task easier, this does in my view give just enough information for me to form an opinion.
14. I will therefore give the opinion on the basis of the wording of the request as originally filed as regards the Digiball position detectors only.

The law

15. Section 60(1) states that:

“Subject to the provisions 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...

(c) where the invention is a process...”

The Invention

16. The patent has a single independent claim, claim 1, which reads as follows:-

A position detector comprising a first member; a plurality of substantially contiguous, substantially spherical identical balls of magnetic material carried by the first member, the balls being disposed side by side in a row in point contact with one another and being constrained against movement relative to one another; a second member, the first and second members being relatively movable in a direction parallel to the line of point contact between the balls in said row, and a transducer which is carried by said second member and which comprises transmitting means for producing a periodically varying magnetic field through the row of balls, and means for sensing phase displaced variations produced in the magnetic field as a result of the relative movement between the first and second members and for producing signals denoting the relative positions of the first and second members, said sensing means comprising at least two pickup coils which are disposed adjacent to and spaced along the row of balls and the line of point contact therebetween; wherein the ratio of the distance between the pickup coils and the line of point contact between the balls to the diameter of the balls is in the range of 1.25 to 1.37.

17. There are five appendant claims of which claims 2 and 3 relate to further refinements of the ratio of the distance between the pickup coils and the line of point contact between the balls to the diameter of the balls (or "pick-up height" as it is referred to by the requester), claims 4 and 5 relate to a tubular construction of the first member, and claim 6 is an omnibus claim.
18. In accordance with section 125(1), the protection of the claims is determined as that specified in a claim as interpreted by the description and any drawings. The standard principles of claim construction were set out by Lord Hoffmann in *Kirin-Amgen and others v Hoechst Marion Roussel Limited and others* [2005] RPC 9 (see paragraphs 32-52). The essence of those principles is that you must put a purposive construction on claim 1, interpreting it in the light of the description. I must also take account of the protocol to Article 69 of the EPC. All of this can be summed up as being that 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.
19. I do not believe there is any problem interpreting the claim until we progress to the definition of the relative dimensions of the balls and the spacing of the pickup coils, which is the crux of the matter before me. The meaning of the diameter of the balls is clear, as the balls are specified earlier in the claim as being substantially spherical and identical. The other important dimension is the distance between the pickup coils and the line of point contact between the balls. The balls are specified as being in point

contact and in a row, so it would I think be clear to the skilled person what the line of point contact between the balls is, even without recourse to the description which says (page 3, lines 15 to 17) that the balls are “arranged side-by-side in contact with each other in a straight line”.

20. The distance from the line of contact to the pickup coils is somewhat more difficult to determine. As the pickup coils have a certain thickness, it is not precisely clear whether one should measure the distance from the line of contact of the balls to the inner or outer radial margin of the coil or to somewhere in between. The specification gives me little or no guidance as to what part of the pickup coil to take as a datum and I note that the drawings of the patent give no indication of from where to measure the pickup height either. Page 8, lines 1 to 13 of the specification of the patent discusses the balance between moving the pickup coil further away from the line of point contact of the balls to reduce distortion and moving the pickup coil closer to increase signal strength. The specification admits however that it is “not yet fully understood why the actual ball diameter is also important in addition to the distance of the pickup coils from the balls”, so the skilled man would I think conclude that this ratio just works in practice and no one knows precisely why.
21. There is some indirect information about dimensions on page 9, lines 22 to 33, where the specification discusses the necessary construction of the tube in which the balls are housed. This passage says that if a small version of the device is required, e.g. the balls are about 5mm in diameter, then to conform to the ratio of ball diameter to pick-up height specified in claim 1 the tube would be very thin, e.g. approximately 0.3mm. This is because of the need for a former around which the pick-up coil is wound. According to my mathematics, if the ball diameter is 5 mm, as referred to in this passage, then the optimum pick height according to claim 1 will be between 6.25 and 6.85 mm (5×1.25 and 5×1.37). The outer radius of a tube with a 0.3 mm wall thickness would be $2.5 + 0.3$ mm, or 2.8 mm. On the face of it that places the measurement datum on the coil at a distance between 3.45 and 4.05 mm from the outer wall of the tube. This does not really seem to be consistent with the suggestion that a 0.3 mm tube wall thickness is necessary to maintain the ratio required by claim 1. That in turn suggests the example is not consistent with the claim, and therefore adds to the difficulty interpreting where on the coil the datum is intended to be. I find that this does not help with determining the scope of claim 1 in this respect.
22. I therefore conclude that claim 1 is unclear as regards the precise definition of the distance between the pickup coils and the line of point contact between the balls since the position on the pickup coil at which the measurement should be made is not defined.

Infringement

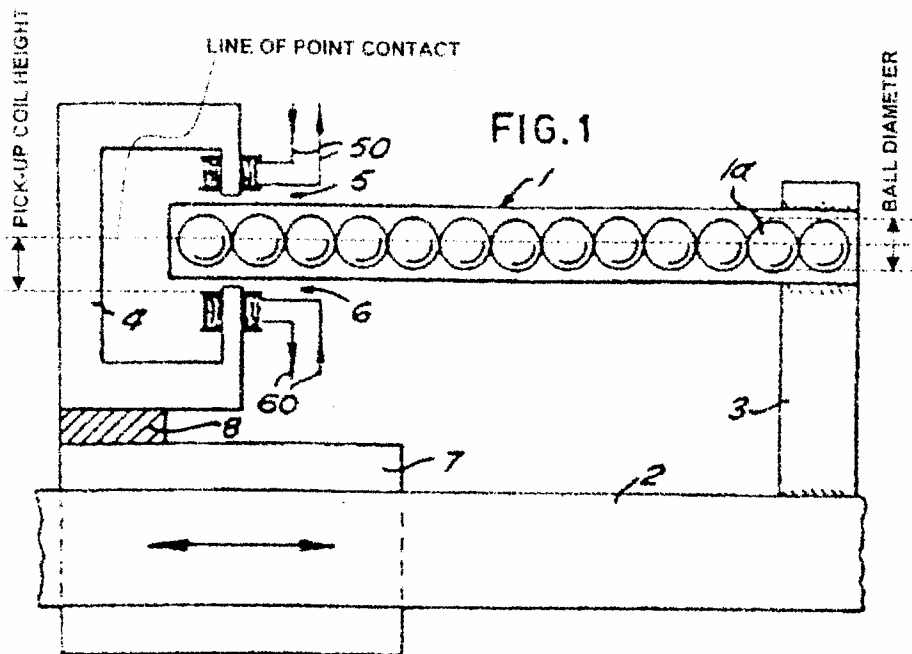
23. As Petrie has not actually sold or supplied the Digiball in the UK, the question of infringement is essentially a hypothetical one, i.e. if Petrie were to sell or supply the Digiball position detector in the UK would that act infringe the patent. I need not therefore dwell on whether any act actually carried out by Petrie falls within the terms of section 60(1) set out in paragraph 19 above.
24. None of the exhibits accompanying the request gives me any detailed construction of the Digiball position detector. The requester refers me to the Digiball web site, www.digiball.com, but that gives no detail of the internal construction of the position detector either. The requester however in any case concedes that the Digiball position detector falls within what he has listed as features a to h of claim 1 of the patent. I have reproduced claim 1 below in the same conveniently broken down format, but I have used the exact wording of claim 1 of the patent as granted save for the vital final feature:-

A position detector comprising:-

- a. a first member;
- b. a plurality of substantially contiguous, substantially spherical identical balls of magnetic material carried by the first member,
- c. the balls being disposed side by side in a row in point contact with one another and being constrained against movement relative to one another;
- d. a second member,
- e. the first and second members being relatively movable in a direction parallel to the line of point contact between the balls in said row,
- f. a transducer which is carried by said second member and which comprises transmitting means for producing a periodically varying magnetic field through the row of balls,
- g. means for sensing phase displaced variations produced in the magnetic field as a result of the relative movement between the first and second members and for producing signals denoting the relative positions of the first and second members,
- h. said sensing means comprising at least two pickup coils which are

disposed adjacent to and spaced along the row of balls and the line of point contact therebetween

25. On the evidence of the construction shown in GB1513567 and the requester's admission, I therefore conclude that the Petrie decoder falls within the ambit of features a to h as listed above.
26. It therefore only remains for me to decide whether the Digiball position detector has the distinguishing feature of claim 1, referred to by the requester as feature i, namely whether the ratio of the distance between the pickup coils and the line of point contact between the balls to the diameter of the balls is in the range of 1.25 to 1.37.
27. This is illustrated in the version of figure 1 of the patent which the requester included in the request and which I have reproduced below. The requester has helpfully added annotations to the original figure 1 of the patent to indicate (one interpretation at least of) the pick-up height. Here the requester has shown the pick-up height as the distance between the line of point contact and an innermost part of the coil, but as discussed in paragraphs 24 to 27 above, the claim is unclear as regards from precisely where these measurements should be taken in relation to the pick-up coils.



28. The only evidence before me in this respect is table VI (below) of the request which relates to two Digiball position detectors of differing ball sizes. I also note that, although the observations filed by Newall comment

on the correspondence between the information in this table and certain of the Newall position detectors (in another table, table V), they do not challenge the accuracy itself of the measurements carried out by Mr Petrie as regards the Digiball position detectors in table VI, so I assume those measurements to be correct.

DIGIBALL ENCODER PRODUCT				
VERSION	NAME	BALL SIZE (mm)	ACTUAL RATIO	PATENT RATIO (1.25 – 1.37)
ANALOG	Series 5	Ø5	0.70-0.73	NOT
	Series 12.7	Ø 12.7	0.65-0.665	PRESENT

29. The requester has considered the interpretation of the pickup height (paragraph 57 of the request) and has proposed to take measurements from the line of contact of the balls to three different datum points, that is, of the minimum possible height (“height” = the distance between the pickup coils and the line of point contact between the balls) as shown in the drawing above, and also a median height, and a maximum height. I think that this is sensible and logical, in that if the ratios for all three of these dimensions for the Digiball were to fall outside the ratio range set out in claim 1, then there could be no infringement.
30. The figure for the range of ratios of pickup height to ball diameter is given in the “actual ratio” column of table VI. The lowest figure in the range, e.g. 0.70 for the series 5, must I think correspond to the least possible pickup height, i.e. when the pickup height is measured to the radially inner extremity of the coil and the highest figure, e.g. 0.73 for the Series 5, must correspond to the greatest possible pickup height, i.e. when the pickup height is measured to the radially outer extremity of the coil. The median height has not apparently ultimately been used, but this would presumably fall approximately half-way between the end points of the range.
31. The ranges of the ratio of the distance between the pickup coils and the line of point contact between the balls to the diameter of the balls of 0.70-0.73 and 0.65-0.665 for the Digiball series 5 and 12.7 position detectors respectively as given in table VI clearly fall well outside the range of 1.25 to 1.37 of claim 1 of the patent. It is therefore my view that the two Digiball position detectors referred to as “Series 5” and “Series 12.7” do not fall within the scope of claim 1.
32. Having concluded that claim 1 of the patent would not be infringed by the Digiball position detectors; since claims 2 to 5 are appendant to claim 1,

they relate to inventions which are in all respects narrower in scope than claim 1 and so cannot be infringed by the Digiball position detectors either.

Opinion

33. I therefore conclude that sale or supply in the United Kingdom of Digiball position detectors conforming to the dimensions that Mr Petrie has indicated would not infringe any of the claims of the patent.

Application for review

34. Under section 74B and rule 77H, the proprietor may, within three months of the date of issue of this opinion, apply to the comptroller for a review of the opinion.

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.

Jim Calvert
Examiner