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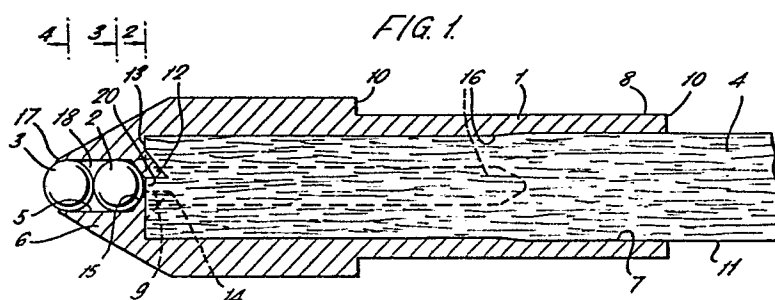
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54 Writing tip.

57 A writing tip for use with aqueous ink, comprising an elongate housing which contains at one end a writing ball 3, at the other end a fibrous feed core 4 extending into the housing. Between the writing ball and the fibrous feed core is a transfer member, which is generally in form of another ball 2. This transfer ball is in contact with both the fibrous feed core and the writing ball to provide a more positive ink transfer to the writing ball.



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"Writing tip"

5 This invention relates to writing tips for pens filled with aqueous ink.

10 Writing tips for use with aqueous ink are known, and comprise an elongate housing, a ball retained in a socket at one end of the housing, and a fibrous feed core having aqueous ink feeding capillaries extending into a bore of the housing from the other end thereof, for transferring aqueous ink to the ball via a grooved feed passage in the housing between the bore and the socket, as for example in U.K. Patent No. 2025857.

15 In these known tips the core is intended to be located in abutting relationship with the end of the grooved feed passage remote from the ball, but ink transfer to the ball is often unreliable, primarily because of poor transfer of ink from the core to the grooved feed passage, for example, due to an axial gap between  
20 the ends of the core and grooved feed passage intended to be in abutting relationship.

25 For a more positive transfer of ink to the ball, the ball itself may abut the core, but this leads to problems of friction between the core and the ball. This friction, means that the ball may not rotate very freely, and thus

the writing tip, drags on the paper and is unpleasant and difficult to write with.

According to the present invention there is  
5 provided a writing tip for use with aqueous ink, wherein  
an elongate housing contains at one end a writing  
ball, held in a socket, and at the other end a fibrous  
feed core having capillaries extending at one end  
into a bore of the housing, characterised by the  
10 provision of transfer member means located in the  
housing, and having a convex surface portion in contact  
with the writing ball, and a further surface portion  
in contact with the fibrous feed core.

This transfer member means may be a ball,  
15 and preferably has then substantially the same diameter  
as the writing ball.

Optionally there may be a plurality of these  
transfer members.

The housing may preferably include a plurality  
20 of feed channels into which parts of the said one end  
extend.

The invention also provides a pen equipped with  
a writing tip as described above, and preferably including  
an ink reservoir into which the feed core extends.

25 It will be appreciated that insertion of the  
core into the feed channel in the manner defined above  
provides positive contact between the core and the ball,

making the transfer of ink therefore more positive due to abutment contact.

In order that the invention may be well understood  
5 an embodiment thereof, which is given by way of example only, will now be described, reference being made to the accompanying drawings, in which:

Figure 1 is a longitudinal section of a writing tip.

10 Figures 2, 3 and 4 are respectively sections of the tip taken along the lines 2-2 and 3-3 and 4-4 of Figure 1.

The illustrated writing tip is for use with  
15 aqueous ink and comprises an elongate housing 1, a transfer ball 2, a writing ball 3, and a feed core 4 extending into a bore 7 in the housing 1 from the end 8 thereof. Balls 2 and 3 are retained in a socket 5 at the other end 6 of the housing 1. Feed core 4  
20 transfers ink from a source (not shown) to the ball 2 via feed channels 9 situated between the bore 7 and the socket 5. The housing is also provided with an annular abutment 10 by which it can be located in a writing instrument.

The core 4 is formed as a stick of longitudinally  
25 extending man-made fibres which are bonded together with a resin to provide aqueous ink feeding capillaries for feeding ink to the ball 2 from the ink source, for example,

a transorbe or reservoir in a writing instrument into which end portion 11 of the core extends in use.

The feed channels 9 illustrated are axially extending and circumferentially spaced.

5                   To provide good tranfer of ink between the core 4 and ball 2, the core 4 is inserted into the end 12 of the feed channels 9 remote from the ball 2. The material of the core is uncompressed within the feed channels 9 and assumes the cross-section of the  
10                   feed channels 9. Figure 2 shows core 4 filling feed channels 9. The stop face 13 is positioned to abut the base 20 of ball 2 which is located on seating surface 15. The insertion of core 4 into feed channels  
15                   9 in an uncompressed condition is made possible by the protrusion into the bore 7 of the angular projections 14 which extend away from ball 2.

The bore 7 is provided with longitudinal flats 16 which radially locate and also secure, the core 11 in the bore 7.

20                   The writing ball 3 which is located in socket 5 is retained by lip 17 and is held in contact but free to revolve against ball 2 which is located on seating 15 supporting ball 3 in this condition.

25                   When ball 3 is revolved due to the motion of writing ink is transferred from core 4 to ball 3, and excess ink will then collect in the reservoir 18 which is formed by the radial volume adjacent to

the contact point between said balls.

The advantages of the aforesaid arrangement is that the writing ball 3 is in point contact with the transfer ball 2, this contact allowing reliable  
5 ink transfer to the writing ball whilst not providing any great frictional drag on the writing ball.

The invention is not limited to the embodiment above. For example the transfer ball 2 need not be  
10 a sphere, it may for instance be egg shaped, or it may be cylindrical with a domed end in contact with the writing ball and a flat end in contact with the feed core.

CLAIMS

1. A writing tip for use with aqueous ink, wherein  
an elongate housing (1) contains at one end (6) a writing  
5 ball (3) in a socket (5) and at the other end (8)  
a fibrous feed core (11), having capillaries 13  
extending at one end (13) into a bore (7) of the housing  
(1), characterised by the provision of transfer member  
means (2), located in the housing (1), and having a convex  
10 surface portion in contact with the writing ball (3)  
and a further surface portion in contact with the  
fibrous feed core (11).

2. A writing tip as claimed in claim 1, further  
15 characterised in that the transfer member means (2)  
is a ball.

3. A writing tip as claimed in claim 2, further  
characterised in that the writing ball (3) and the  
20 transfer ball (2) have substantially the same diameter.

4. A writing tip as claimed in any of the preceding  
claims, further characterised in that the transfer means  
comprises a plurality of transfer members.

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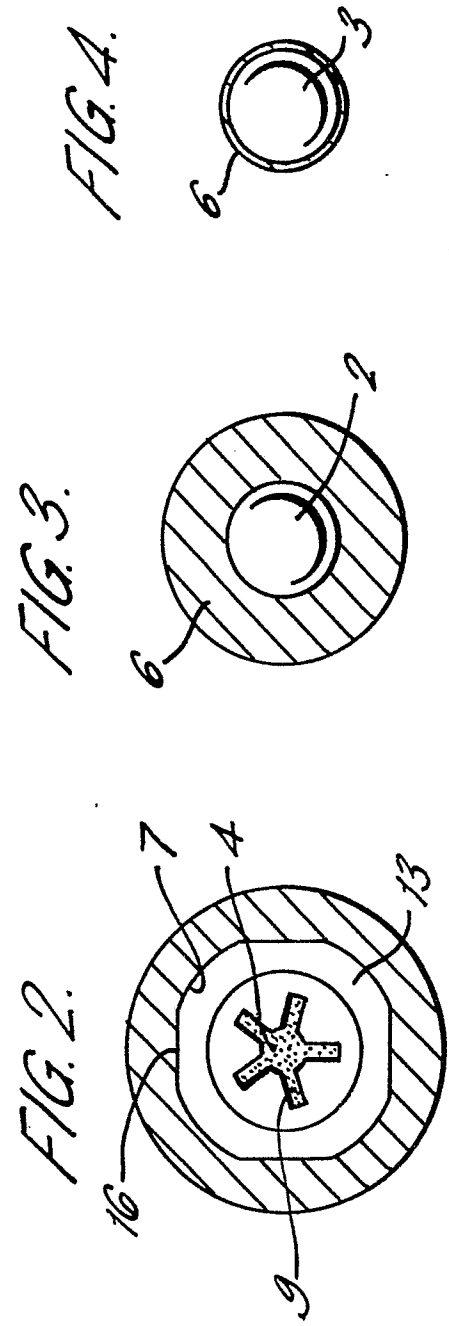
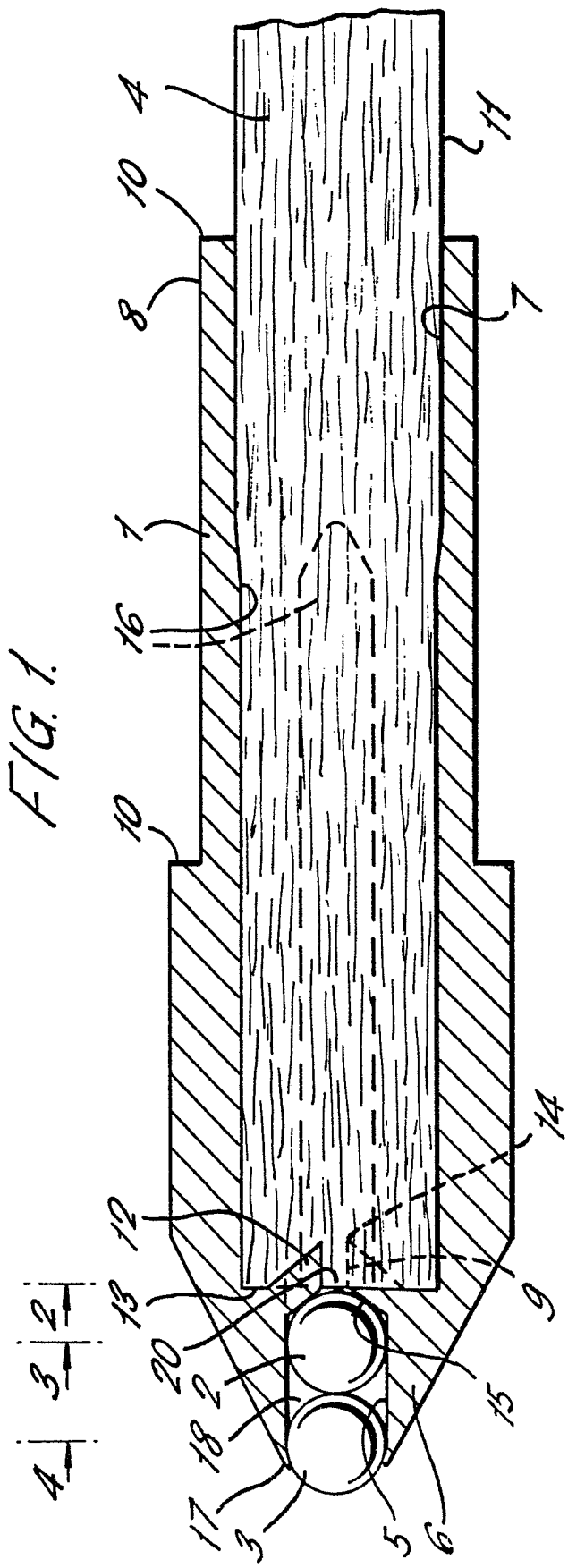
5. A writing tip as claimed in any of the preceding  
claims characterised further in that the housing (1) includes

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a plurality of feed channels (9) and parts of said one end (13) of the feed core extend into the feed channels.

5           6. A pen, characterised by being provided with a writing tip as claimed in any one of claims 1 to 5.

          7. A pen, as claimed in claim 6, and further characterised by including an ink reservoir into which  
10 the feed core extends.





European Patent  
Office

# EUROPEAN SEARCH REPORT

0065828

Application number

EP 82 30 2230

| 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. 3)          |
| X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | CH-A- 222 566 (MITRANI)<br><br>* Whole document *                                         | 1,2,4,<br>6,7                                  | B 43 K 7/10                                             |
| X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | FR-A- 813 499 (LAFOREST)<br><br>* Page 1, lines 50-62; page 2, line 34 - page 3, line 8 * | 1-4,6,<br>7                                    |                                                         |
| A,D                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | GB-A-2 025 857 (WAITE)<br>* Claim 1 *                                                     | 1,5                                            |                                                         |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | GB-A-1 175 860 (ZYBERT)                                                                   |                                                |                                                         |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | US-A-3 010 139 (PARKER)                                                                   |                                                |                                                         |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | DE-C- 513 008 (SCHEKAT)                                                                   |                                                | TECHNICAL FIELDS<br>SEARCHED (Int. Cl. 3)<br><br>B 43 K |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | DE-C- 703 046 (STELZER)                                                                   |                                                |                                                         |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | FR-A-2 368 372 (STAEDLER)                                                                 |                                                |                                                         |
| The present search report has been drawn up for all claims                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                           |                                                |                                                         |
| Place of search<br>THE HAGUE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                           | Date of completion of the search<br>16-08-1982 | Examiner<br>LAMMINEUR P.C.G.                            |
| <p><b>CATEGORY OF CITED DOCUMENTS</b></p> <p>X : particularly relevant if taken alone<br/> Y : particularly relevant if combined with another document of the same category<br/> A : technological background<br/> O : non-written disclosure<br/> P : intermediate document</p> <p>T : theory or principle underlying the invention<br/> E : earlier patent document, but published on, or after the filing date<br/> D : document cited in the application<br/> L : document cited for other reasons<br/> &amp; : member of the same patent family, corresponding document</p> |                                                                                           |                                                |                                                         |