



(12) UK Patent (19) GB (11) 2 202 792 (13) B

(54) Title of Invention

Improvements in and relating to wire binding elements

(51) INT CL⁶; B42B 5/10

(21) Application No
8707843.2

(22) Date of filing
02.04.1987

(43) Application published
05.10.1988

(45) Patent published
08.05.1991

(72) Inventor(s)
Leonard William Norton
Jones

(73) Proprietor(s)
James Burn International
Limited

(Incorporated in the United
Kingdom)

Douglas Road
Esher
Surrey KT10 8BD
United Kingdom

(74) Agent and/or
Address for Service
Lloyd Wise Tregear & Co
Norman House
105-109 Strand
London WC2R 0AE
United Kingdom

(52) Domestic classification
(Edition K)
B6A ABK

(56) Documents cited
None

(58) Field of search

As for published application
2202792 A viz:
UK CL B3A, B6A
INT CL B42B
updated as appropriate

Additional Fields
UK CL(Edition K) B6A AAA

2202792

Fig.1.

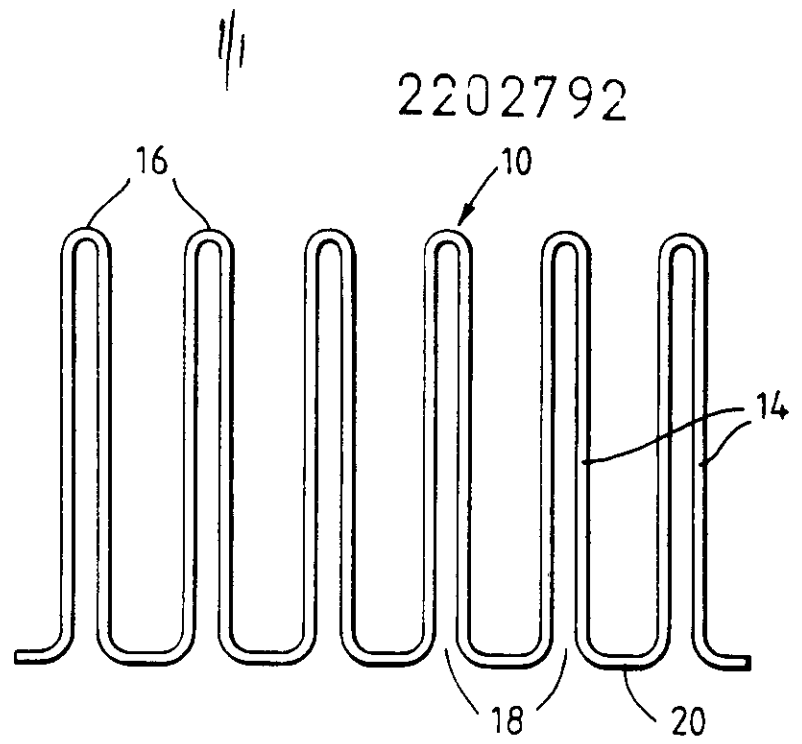


Fig.2.

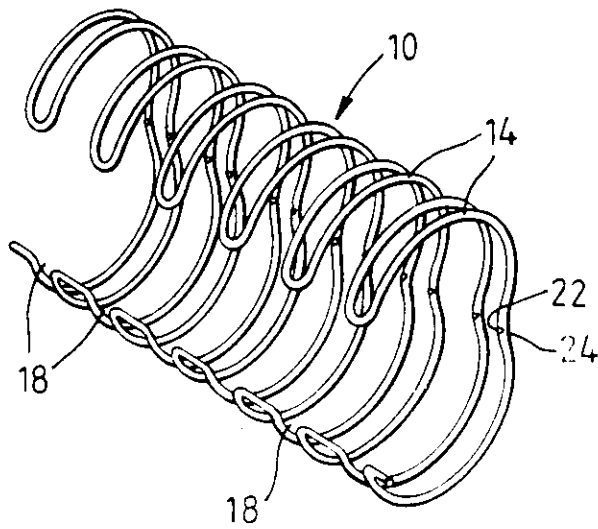
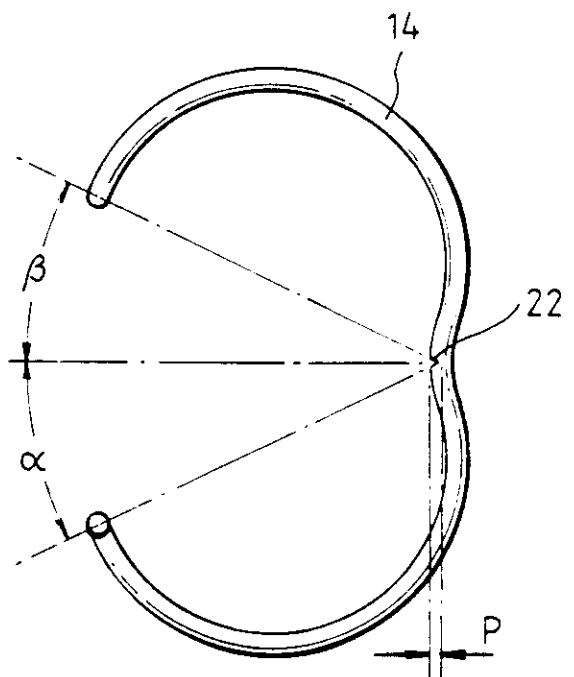


Fig.3.



IMPROVEMENTS IN AND RELATING TO WIRE BINDING ELEMENTS

/1/

This invention relates to wire binding elements for perforated sheets and to the manufacture of such elements.

A known method of binding perforated sheets uses binding elements which are lengths of wire bent so as to form curved prongs on which the sheets are impaled. The element is provided, at the time of the impaling operation, in the form of a tube having a longitudinal slot in its wall and the final stage in the binding process is to close the slot by bringing the closed end of the prongs into their open ends.

Such elements are generally manufactured by firstly converting a length of wire to the so-called 'zig-zag' form, hereinafter referred to as a strip of zig-zagged wire of the kind set forth, in which the wire assumes the shape of a flat comb of indefinite length the prongs of which are 'closed' at their tips and 'open' at their bases or roots which are connected to their neighbours by aligned lengths of wire forming the stock or spine of the comb so that the pitch of the prongs corresponds to the pitch of the perforations in the sheet to be bound. A long length of such flat zigzag material is then brought to the slotted tube form, hereinafter referred to as a slotted tubular form as set forth

herein, by suitable bending of the prongs.

Such binding elements have been provided with a 'nick' or indentation on the uppermost side of the prongs midway along their lengths. This is to facilitate the closing of the element in the final bending operation by dictating the fulcrum of the bend.

However, it has been found that the prongs have a tendency to bend, not at the 'nick' as expected, but rather, at a point a short distance away from the 'nick' around the curved prongs. This occurs especially in binding elements of larger pitches and wire diameters. Moreover, since the 'nick' is provided on the tension side of the element, it has a tendency to tear apart when the element is closed and become aesthetically unsightly especially when the element is formed from nylon coated wire. A further problem which has been found is that the 'nick' can provide an ingress point for corrosion.

A binding element in accordance with the present invention comprises a strip of zigzagged wire of the kind set forth, the strip being in the slotted tubular form as set forth herein and having an indentation on the concave surface of that part of each prong which is midway between its tip

and root.

5 This arrangement has been found to assist the closing
of the wire much more effectively since it results in the
fulcrum of the bend always being in the same position as
the indentation. A further advantage is that by
positioning the 'nick' on the underside of the prongs it
10 cannot be seen. Moreover, this side is in compression when
the element is closed and therefore during the final
binding operation the 'nick' also closes up rather than
pulling open.

 The indentation may be produced either by a forming
15 operation or by a cutting operation.

 One method of forming an indentation on the uppermost
or convex side of the prongs after the strip of zigzagged
wire has been converted to the slotted tube from is
described in our patent no. GB1251807. A similar method
20 may be used to produce an indentation on the concave side
of the prongs. Alternatively the indentation may be
produced when the zigzagged wire is in the unformed state.

 The invention will now be further described, by way of
example, with reference to the accompanying drawings, in
25 which:-

 Figure 1 shows a length of zigzag wire

forming part of a binding element of the type described,

Figure 2 shows a length of slotted tube formed from the wire element shown in Figure 1, and

Figure 3 shows an end view of a binding element in accordance with the present invention.

The strip 10 shown in Figure 1 is comb like, having prongs 14 closed at their tips 16 and open at their roots 18 where they are connected by lengths of wire 20. When the strip 10 has been converted to the slotted tubular form, it is in the condition illustrated in Figure 2 with the prongs 14 curved so that perforated sheets can be impaled. That operation having been performed, the binding is completed by bringing the tips 16 of the prongs into their roots or open ends 18.

This final binding operation is greatly facilitated if the binding element is provided with an indentation 22 on the concave side of each prong 14 midway between its root and tip as shown in Figure 3. The indentation dictates the position of the bend on closing the element thus ensuring that the final configuration of the element is a full round circle. In prior art binding elements where the indentation was provided on the uppermost side of the prongs, the prongs had a

tendency to bend, not around the position defined by the indentation but around the weakest points on the curved wire, a short distance away from the indentation around the curved prongs.

It will be appreciated that the position of the indentation is such that the indentation is not readily seen and that on closing there will be no tendency for it to tear open; rather it will close up. Therefore, the indentation is extremely unlikely to provide an ingress point for corrosion.

The sides of the indentation make angles α and β with axis x-x of the binding element. These angles are preferably equal to each other so that the indentation is symmetrical about the axis. Angle α (or β) is preferably between 45° about 55° .

The depth of the indentation, dimension P on Figure 3, will obviously depend on the diameter of the wire from which the binding element is made. The maximum value of P is preferably about 40% of the diameter of the wire.

As is described in our GB Patent No. 1251807 the conversion of a strip zigzagged wire to the slotted tube condition may be effected by feeding the wire over an anvil in a step-by-step fashion and, while

the strip is held stationary, clamping it so that the tips and roots of the prongs overhang the anvil. The overhanging portion of each prong is then struck with two or more hammers to cause it to conform to a shape determined by the anvil i.e. to the slotted tube configuration. The indentation may be produced in the last stage of such an operation by providing a projection on the anvil and a corresponding depression on the clamp. The indentation will then be formed as the binding element leaves the apparatus. A cutting operation could be employed instead i.e. to remove rather than to displace metal.

Alternatively a forming or cutting tool can be positioned before the slotted tube forming means so that the indentation is produced while the wire is still in the zigzagged condition. This has the advantage of aiding centralisation of the strip prior to the tube forming operation.

The tools used to produce the indentations should preferably be adjustable so that the depth of the indentation may be varied. Furthermore, the indentation may be cut or formed in different shapes but is preferably always symmetrical about the mirror axis of the prongs.

5 CLAIMS

(7/

1. A binding element for perforated sheets comprising a length of wire bent so as to form curved prongs on which the sheets may be impaled, the wire being in the shape of
10 a flat comb, the prongs of which are closed at their tips and opened at their bases or roots which are connected to their neighbours by aligned lengths of wire forming the stock or the spine of the comb, the strip being designed to be converted to a slotted tube by suitable bending of the
15 prongs characterised in that the concave surface of that part of each prong which is midway between its tip and root is formed with an indentation.
 2. A binding element as claimed in Claim 1 wherein the indentation on the prongs is formed prior to the wire
20 element being converted to the open tube formation.
 3. A binding element as claimed in Claim 1 or 2 wherein the sides of the indentation are at an equal angle ~~to~~ with the main transverse axis of the binding element, so that the indentation is symmetrical about its axis.
 - 25 4. A binding element as claimed in Claim 3 wherein the angle lies between 45° and 55°.
 5. A binding element as claimed in any one of the preceding claims wherein the depth of the indentation is about forty per cent of the diameter of the wire.
-

REGISTER ENTRY FOR GB2202792

Form 1 Application No GB8707843.2 filing date 02.04.1987 ✓

Title IMPROVEMENTS IN AND RELATING TO WIRE BINDING ELEMENTS

Applicant/Proprietor

JAMES BURN INTERNATIONAL LIMITED, Incorporated in the United Kingdom,
Douglas Road, Esher, Surrey KT10 8BD, United Kingdom [ADP No. 00531368002]

Inventor

LEONARD WILLIAM NORTON JONES, 'Aranka', 14 Hillgarth, Churt Road,
Hindhead, Surrey GU26 6PP, United Kingdom [ADP No. 00191957001]

Classified to

B6A
B42B

Address for Service

LLOYD WISE TREGEAR & CO, Norman House, 105-109 Strand, London WC2R 0AE,
United Kingdom [ADP No. 00000117009]

Publication No GB2202792 dated 05.10.1988

Examination requested 29.09.1988 ✓

Patent Granted with effect from 08.05.1991 (Section 25(1)) with title
IMPROVEMENTS IN AND RELATING TO WIRE BINDING ELEMENTS ✓

**** END OF REGISTER ENTRY ****

OA80-01
FG

OPTICS - PATENTS

24/09/91 13:11:06
PAGE: 1

RENEWAL DETAILS

PUBLICATION NUMBER GB2202792

PROPRIETOR(S)

James Burn International Limited, Incorporated in the United
Kingdom, Douglas Road, Esher, Surrey KT10 8BD, United Kingdom

DATE FILED	02.04.1987
DATE GRANTED	08.05.1991
DATE NEXT RENEWAL DUE	02.04.1992
DATE NOT IN FORCE	
DATE OF LAST RENEWAL	08.05.1991
YEAR OF LAST RENEWAL	05
STATUS	PATENT IN FORCE /