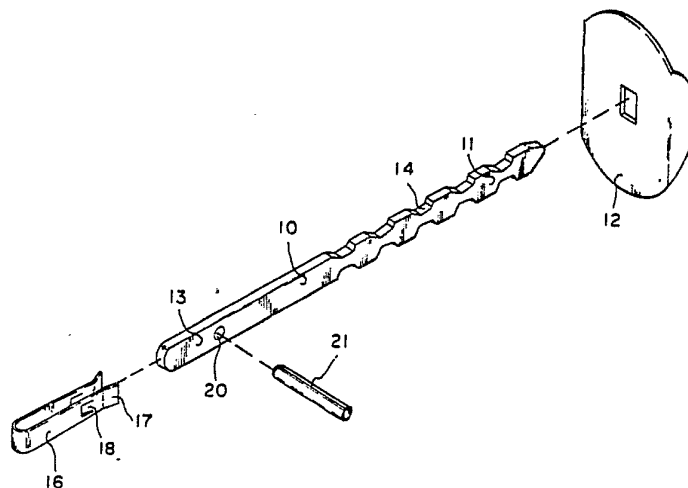


INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ³ : E04B 1/62; F16B 21/04	A1	(11) International Publication Number: WO 80/00162 (43) International Publication Date: 7 February 1980 (07.02.80)
<p>(21) International Application Number: PCT/US79/00471</p> <p>(22) International Filing Date: 2 July 1979 (02.07.79)</p> <p>(31) Priority Application Number: 920,775</p> <p>(32) Priority Date: 30 June 1978 (30.06.78)</p> <p>(33) Priority Country: US</p> <p>(71) Applicant: OMARK INDUSTRIES, INC. [US/US]; 301 New Albany Road, Moorestown, NJ 08057 (US).</p> <p>(72) Inventor: PRESTON, Francis, J.; 201 Cambridge Drive, Cinnaminson, NJ 08077 (US).</p> <p>(74) Agent: DUFFIELD, Charles, F.; 300 Kings Highway East, Haddonfield, NJ 08033 (US).</p>	<p>(81) Designated States: BR, DE, FR (European patent), GB, JP.</p> <p>Published with: <i>International search report</i></p>	

(54) Title: ANCHORING MEANS FOR INSULATION HANGERS



(57) Abstract

A refractory anchor lining system employing an elongate and weldable stud which is secured to the walls of furnaces, kilns and the like and upon which an insulating blanket is supported and clipped in place. The weldable end of the elongate anchor includes a recess (15, 19) in one instance or an aperture (20) in a second instance to interlock with the U-shaped clip (16) as respects the recess (19) and to interlock alternately with the U-shaped clip (16) or a roll pin (21) in the second instance to permit the system to be interconnected into the nonmetallic walls of high density fire brick using the U-shaped clip or low density fire brick using the elongate roll pin.

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DescriptionANCHORING MEANS FOR INSULATION HANGERSTechnical Field

The invention relates to refractory anchor lining
5 systems for securing insulating blankets in place on the
walls and ceilings of high temperature structures such as
furnaces, kilns and the like.

Background Art

The present invention constitutes improvements to the
10 refractory anchor lining system disclosed in United States
patent 3,738,217 issued June 12, 1973. In that patent, the
disclosure of which is incorporated herein by reference,
there is disclosed an elongate anchor assembly in which one
end thereof is intended to be welded to the metallic walls
15 of furnaces, kilns and the like and the other end used to
support a refractory lining or blanket impaled upon or
over the elongate refractory anchor. Clips cooperating
with notches in the outer extremity of the elongate anchor
are used to secure the outer surface of the insulating
20 blanket in place.

Refractory anchor systems as disclosed in United
States patent 3,738,217 work well in their application to
metallic walls when welded by the stud end welding tech-
nique to secure them in place. However, this type of
25 anchor system does suffer the drawback in that it cannot
be used to secure insulation blankets to the walls of
furnaces, kilns and the like which utilize nonmetallic
walls or, more specifically, high density or low density
fire brick.

30 Disclosure of Invention

In accordance with the present invention, the end of
the elongate anchor which is intended to be welded includes



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interlocking means which, in one instance, is a recess or notch cut into the anchor and, in a second instance, an aperture through the anchor. Anchor securing means are provided for engaging and interconnecting with the interior of either high density or low density fire brick.

In the case of high density fire brick, a U-shaped clip is provided which has outturned ears at the extremity of the U as well as inturned ears. The inturned ears are adapted to cooperate with the notch or aperture in the end of the elongate anchor to interconnect with the anchor whereas the outturned ears are designed to engage the interior of a hole drilled into the dense fire brick.

In the case of low density fire brick, an elongate roll pin is provided which is received by the aperture in the end of the elongate anchor and is designed to interconnect with the low density fire brick by being pushed into the fire brick and rotated through an angle to interlock into the interior of the fire brick.

Brief Description of Drawings

Figure 1 is a perspective exploded view of a first embodiment of the invention;

Figure 2 is a perspective exploded view of a second embodiment of the invention;

Figure 3 is a sectional side view of the system of the present invention welded in place to metallic walls;

Figure 4 is a sectional side view of both the embodiments of Figures 1 and Figures 2 in place in high density fire brick;

Figure 5 is a detailed sectional side view of the embodiment of Figure 1 in place in fire brick;

Figure 6 is a detailed sectional side view of the embodiment of Figure 2 in place in high density fire brick;

Figure 7 is a sectional side view of the embodiment of Figure 2 in place prior to locking in low density fire brick;



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and

Figure 8 is a sectional view of the embodiment in Figure 2 locked into place in low density fire brick.

Best Mode for Carrying Out the Invention

5 The refractory anchor lining systems of the present invention are shown, in two different embodiments, in Figures 1 and 2 respectively of the drawings. Referring first to Figure 1, the system includes an elongate metallic anchor 10 which is adapted to be welded at one end 13 to
10 metallic walls of furnaces and the like by the stud end welding technique. The opposite end 11 of the anchor includes a plurality of tapered notches 14 adapted to interlock with an aperture in a retaining clip 12. The method of use and details of the metallic anchor, clip and inter-
15 locking system for securing insulation blankets to the walls of furnaces and the like is described in detail in United States patent 3,738,217, issued June 12, 1973 heretofore discussed and it is not believed necessary to repeat the details herein.

20 In accordance with the invention, the embodiment in Figure 1 at the end weldable end 13 thereof includes a notch or recess 15 cut into the rectangular cross section of the elongate anchor. A U-shaped clip 16 is provided which includes a pair of outturned ears 17 at the extrem-
25 ities of the U-shaped configuration. Additionally, a pair of inturned ears 18 are provided towards the end of the U-shaped extremity adjacent the outturned ears 17.

30 The embodiment shown in Figure 1 used in conjunction with the U-shaped clip 16 is intended for anchoring the elongate anchor 10 to high density fire brick. The system, in use, is shown generally in the upper portion of Figure 4 and, in detail, in Figure 5 as respects the embodiment of Figure 1.

35 In use, the high density fire brick is drilled perpendicular to the surface of the fire brick with a drill



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of a diameter slightly less than the spacing between the
outturned ears 17 of the clip 16 and to a depth in excess
of the length of the U-shaped clip 16. Thereafter, as may
be seen in Figures 4 and 5, the clip 16 is pushed over the
5 end 13 of the anchor 10 until the inturned ears 18 inter-
lock with the recess 15 formed within the anchor 10.
Thereafter, the anchor 10 is driven into the drilled hole
in the high density fire brick whereupon the outturned
ears 17 resiliently engage the interior of the drilled hole.
10 The force upon the outturned ears 17 serves both to inter-
lock the outturned ears 17 with the interior of the drilled
hole to prevent the clip 16 from being pulled from the hole
while, at the same time, forceably maintaining engagement
of the inturned ears 18 with a square shoulder 19 of the
15 recess 15, as best shown in Figure 5. In this manner, the
lining anchor 10 which may also be used for metallic walls
may alternately be used with high density fire brick to
secure the anchor in place as heretofore described.

The embodiment shown in Figure 2 may also be used to
20 secure refractory lining to metallic walled structures as
the embodiment of Figure 1 by the stud end welding tech-
nique as shown in Figure 3 and alternately for securing of
the anchor into high density fire brick as shown in Figures
4 and 5 but additionally, provides means by which the anchor
25 may also be secured into low density fire brick.

The interlocking means for cooperating with the anchor
securing means in the embodiment of Figure 2 is an aperture
or hole 20 drilled through the end 13 of the anchor 10
perpendicular to the longitudinal axis of the anchor. In
30 the embodiment of Figure 2, in the case of high density
fire brick, the same U-shaped clip 16 is employed. In this
instance, the inturned ears 18 engage the aperture 20 to
provide the interlock between the U-shaped clip 16 and
the anchor 10.

35 The use of the embodiment in Figure 2, in the case of
high density fire brick, is substantially identical to that



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of the embodiment of Figure 1. The embodiment of Figure 2 in use with high density fire brick is shown generally in the lower portion of Figure 4 and in detail in Figure 6. Specifically, the interlock of the inturned ears 18 with the aperture 20 is shown in detail in Figure 6. The remainder of the structure and method of installation of the embodiment of Figure 2, with respect to high density fire brick, is the same as the embodiment in Figure 1 and it is not believed necessary to discuss that aspect in any more detail as respects the embodiment of Figure 2.

A roll pin 21 is provided for use with the embodiment of Figure 2 in respect to low density fire brick. The roll pin 21 is designed to be forceably inserted into the aperture 20, as more specifically shown in detail in Figures 7 and 8.

Once the roll pin 21 is positioned in place in the anchor 10, the anchor is then forced into the interior of low density fire brick 22 to a depth sufficient to provide the required amount of exposure of the opposite end 11 of the anchor 10 to appropriately secure the blanket insulation 23 in place as shown in Figure 7. Thereafter, as shown in Figure 8, the anchor 10 is rotated through an angle, preferably 90 degrees, to turn the roll pin 21 out of alignment with the notch that the roll pin cut into the low density fire brick 22 upon insertion and to thereby interlock the roll pin 21 and associated anchor 10 in place in the low density fire brick.

From the foregoing, it will be appreciated that the embodiment of Figure 1 provides a refractory anchoring system which may be conventionally welded to a metal refractory wall 24, as shown in Figure 3, to secure a blanket of insulation 23 in place and, alternately, used to secure a blanket of insulation in place upon a high density fire brick wall 25, as shown in the upper portion of Figure 4 and in detail in Figure 5, utilizing the U-shaped clip 16. Additionally, the embodiment of Figure 2, in addition to



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having the same uses in securing insulation to metallic walls and to high density fire brick, also provides a means by which the anchor and associated insulation may be secured into low density fire brick walls 22 and as shown in Figures 5 7 and 8.

The refractory anchor lining system of the present invention has been described in respect to its use for securing refractory linings to walls of furnaces, kilns and the like. However, it is anticipated that the hanger assembly may have many other uses in environments other than refractory furnaces. Additionally, while the invention has been described in respect to particular embodiments thereof as shown in the drawings, no limitation is thereby intended, but instead, the scope of the invention is to be interpreted in view of the appended claims.



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Claims

1. In refractory anchor lining systems for securing refractory linings to walls of furnaces, kilns and the like of the type having an elongate anchor secured at a first
5 end to the wall against which the lining is to be secured and the lining impaled upon the anchor and secured by a clip at the opposite end of the anchor, the improvements in the anchoring system permitting use of the system for securing lining to walls of different composition and den-
10 sity comprising:

anchor securing means for engaging and interconnecting with the interior of the wall upon which the insulation is to be secured; and

15 interlocking means adjacent the first end of the elongate anchor for interlocking the elongate anchor with the anchor securing means to secure the elongate anchor to the wall when the elongate anchor and anchor securing means are forced into the interior of the wall.

2. The improvements of Claim 1 wherein the anchor securing
20 means is a U-shaped clip adapted to be positioned over the first end of the elongate anchor and wherein the clip includes outturned ears at the extremity of the legs of the U-shaped clip adapted to engage and lock with the interior of a predrilled hole in high density fire brick.

25 3. The improvements of Claim 2 wherein the interlocking means is a recess positioned within the first end of the elongate anchor and wherein the U-shaped clip further includes inturned ears at the extremities of the legs of the U-shaped clip for engaging the recess.

30 4. The improvements of Claim 1 wherein the anchor securing means is an elongate member interlocking with the



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elongate anchor on an axis perpendicular to the elongate axis of the elongate anchor to provide interlock with the interior of low density fire brick upon being forced into the interior of the fire brick and rotated.

5 5. The improvements of Claim 1 wherein the interlocking means is an aperture in the elongate anchor perpendicular to the longitudinal axis of the elongate anchor.

6. The improvements of Claim 5 wherein the anchor securing means is a U-shaped clip adapted to be positioned over the
10 first end of the elongate member and wherein the clip includes outturned ears at the extremities of the legs of the U-shaped clip adapted to engage and lock with the interior of a predrilled hole in high density fire brick.

7. The improvements of Claim 5 wherein the anchor securing
15 means is an elongate member interlocking with the elongate anchor on an axis perpendicular to the elongate axis of the elongate anchor to provide interlock with the interior of low density fire brick upon being forced into the interior of the fire brick and rotated.

20 8. The improvements of Claim 1 wherein the first end of the elongate anchor is formed of an end weldable material capable of being welded by the stud end welding technique to permit the elongate anchor to be welded to metallic walls and thereby secured in place.



Fig. 1

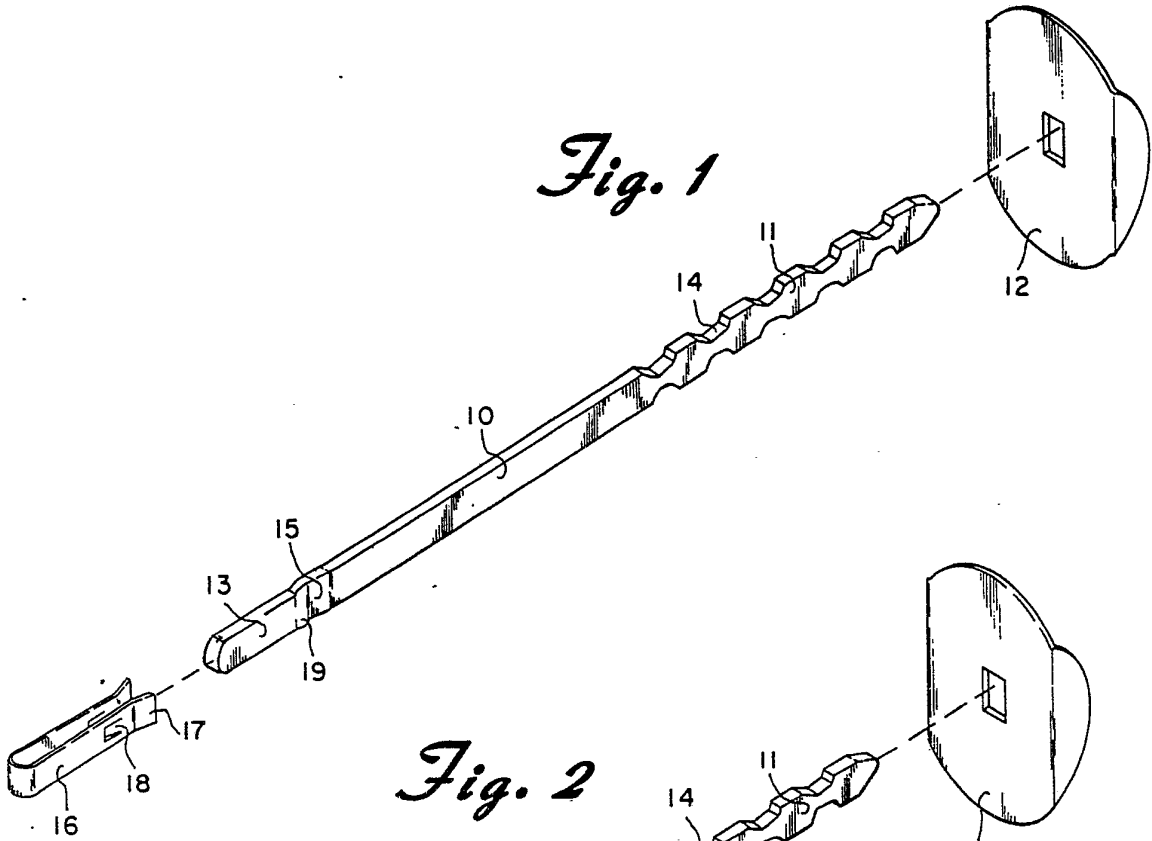


Fig. 2

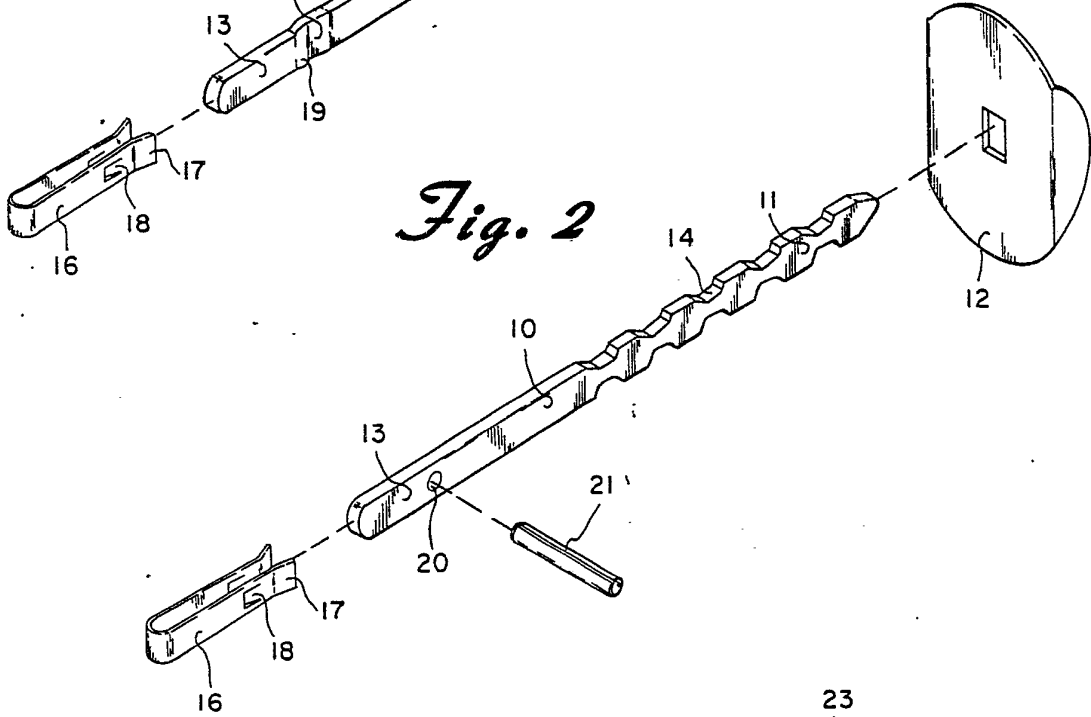


Fig. 3

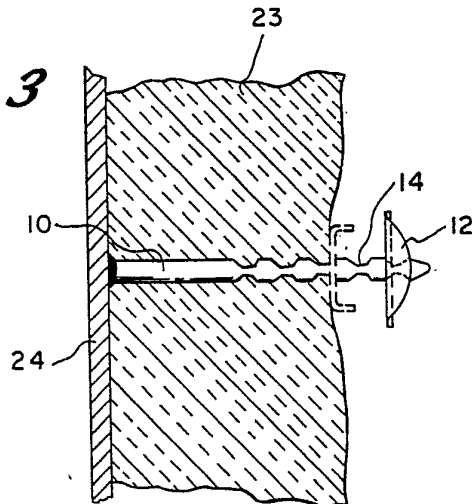


Fig. 4

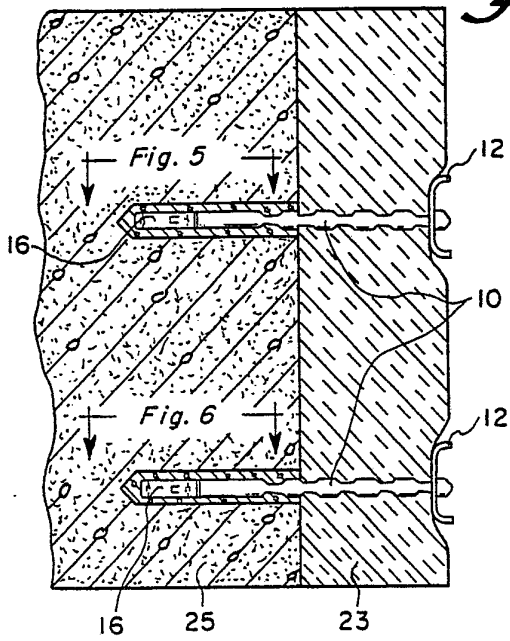


Fig. 5

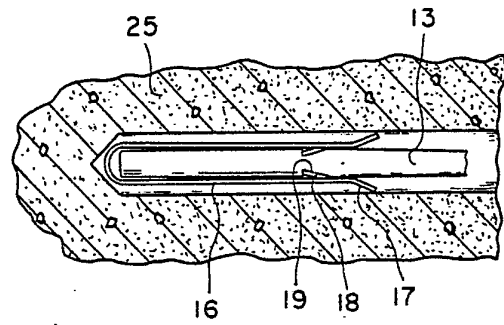


Fig. 6

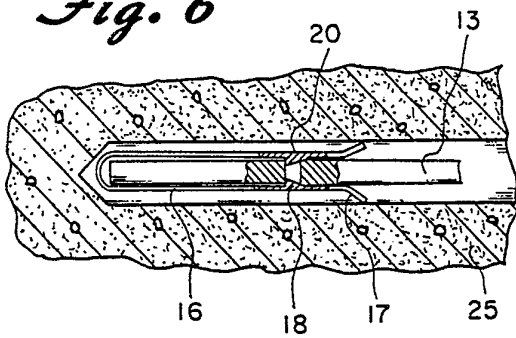


Fig. 7

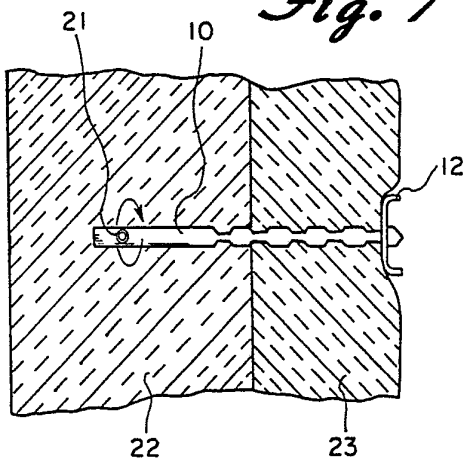
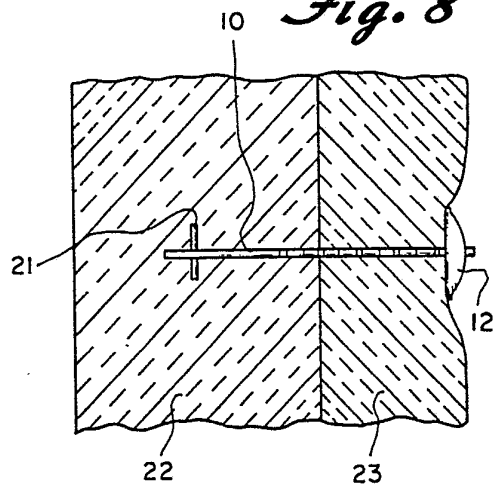


Fig. 8



INTERNATIONAL SEARCH REPORT

Wo 80/00162
PCT/US79/00471

International Application No

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) *				
According to International Patent Classification (IPC) or to both National Classification and IPC Int. Cl. E 04B, 01/62; F 16B, 21/04 U.S. Cl. 52/410, 506; 85/8.6				
II. FIELDS SEARCHED				
Minimum Documentation Searched ⁴				
Classification System	Classification Symbols			
U.S.	85/3R, 5P, 8.6, 80, 84, 85, 52/410, 506 110/136			
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched ⁵				
III. DOCUMENTS CONSIDERED TO BE RELEVANT ¹⁴				
Category *	Citation of Document, ¹⁶ with indication, where appropriate, of the relevant passages ¹⁷	Relevant to Claim No. ¹⁸		
X	US, A, 4,018,023, published 19 April 1977, Anderson.	1		
X	GB, A, 1,359,291, published 10 July 1974, Nock.	1		
X	US, A, 3,523,395, published 11 August 1970, Rutter et al.	1		
X,P	US, A, 4,139,975, published 20 February 1979, Baker.	1,5,8		
X	US, A, 2,574,330, published 06 November 1951, Judd.	2,3,6		
X	FR, A, 1,404,564, published 20 May 1964, Raymond.	2,3,6		
X	US, A, 2,347,581, published 25 April 1944, Turner.	4,7		
X	US, A, 3,897,035, published 29 July 1975, Solo.	4,7		
A	DE, A, 2,530,555, published 18 March 1976, Shelly.	1,4,7		
A	US, A, 2,394,443, published 05 February 1946, Guignon.	1,6,8		
A	US, E, RE. 22,544, published 05 February 1944, Tinnerman.	2,3,6		
A	US, A, 3,738,217, published 12 June 1973, Walker.	1,8		
<p>* Special categories of cited documents: ¹⁵</p> <table style="width:100%; border: none;"> <tr> <td style="width: 50%; border: none;"> <p>"A" document defining the general state of the art</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document cited for special reason other than those referred to in the other categories</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> </td> <td style="width: 50%; border: none;"> <p>"P" document published prior to the international filing date but on or after the priority date claimed</p> <p>"T" later document published on or after the international filing date or priority date and not in conflict with the application, but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance</p> </td> </tr> </table>			<p>"A" document defining the general state of the art</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document cited for special reason other than those referred to in the other categories</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p>	<p>"P" document published prior to the international filing date but on or after the priority date claimed</p> <p>"T" later document published on or after the international filing date or priority date and not in conflict with the application, but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance</p>
<p>"A" document defining the general state of the art</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document cited for special reason other than those referred to in the other categories</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p>	<p>"P" document published prior to the international filing date but on or after the priority date claimed</p> <p>"T" later document published on or after the international filing date or priority date and not in conflict with the application, but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance</p>			
IV. CERTIFICATION				
Date of the Actual Completion of the International Search ²	Date of Mailing of this International Search Report ³			
04 October 1979	24 OCT 1979			
International Searching Authority ¹	Signature of Authorized Officer ²⁰			
ISA/US	<i>Thomas J. Holter</i>			

FURTHER INFORMATION CONTINUED FROM THE SECOND SHEET

V. OBSERVATIONS WHERE CERTAIN CLAIMS WERE FOUND UNSEARCHABLE ¹⁰

This international search report has not been established in respect of certain claims under Article 17(2) (a) for the following reasons:

1. Claim numbers _____, because they relate to subject matter ¹² not required to be searched by this Authority, namely:
2. Claim numbers _____, because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out ¹³, specifically:

VI. OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING ¹¹

This International Searching Authority found multiple inventions in this international application as follows:

Invention 1: Claims 1-3,8

Invention 2: Claims 1-3,5,6,8

Invention 3: Claims 1,4,5,7,8

1. As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims of the international application.
2. As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims of the international application for which fees were paid, specifically claims:
3. No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claim numbers:

Remark on Protest

- The additional search fees were accompanied by applicant's protest.
- No protest accompanied the payment of additional search fees.