



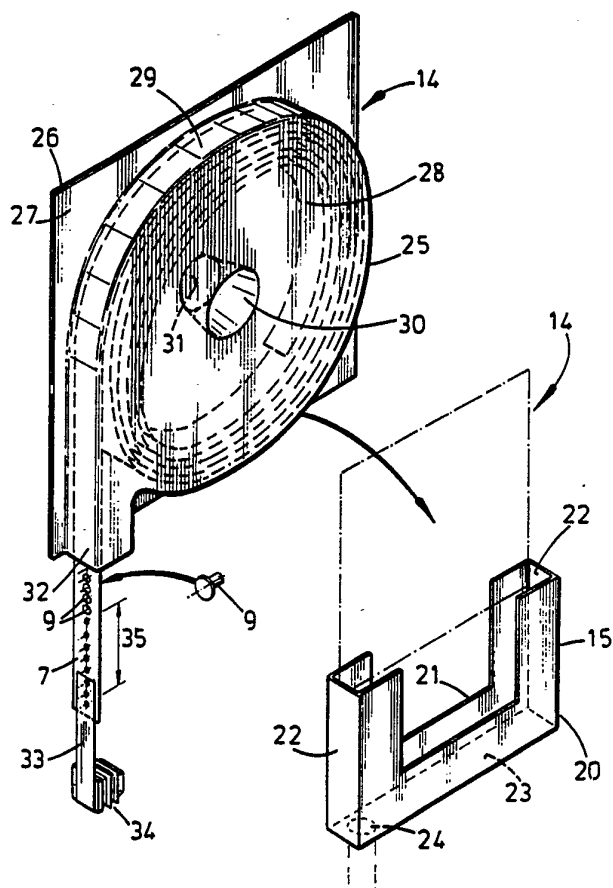
INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁵ : B21J 15/32	A1	(11) International Publication Number: WO 93/01014 (43) International Publication Date: 21 January 1993 (21.01.93)
(21) International Application Number: PCT/GB92/01272 (22) International Filing Date: 13 July 1992 (13.07.92) (30) Priority data: 9114953.4 11 July 1991 (11.07.91) GB (71) Applicant (for all designated States except US): HENROB LIMITED [GB/GB]; Aber Park, Flint, Clwyd CH6 5EX (GB). (72) Inventor; and (75) Inventor/Applicant (for US only) : BLACKET, Stuart, Edmund [AU/AU]; 18 Beaufort Street, Alderley, Brisbane, QLD 4051 (AU). (74) Agent: MOCK, Hans; Marks & Clerk, Suite 301, Sunlight House, Quay Street, Manchester M3 3JY (GB).		(81) Designated States: AT, AU, BB, BG, BR, CA, CH, CS, DE, DK, ES, FI, GB, HU, JP, KP, KR, LK, LU, MG, MN, MW, NL, NO, PL, RO, RU, SD, SE, US, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LU, MC, NL, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, SN, TD, TG). Published <i>With international search report.</i>

(54) Title: A PORTABLE RIVETING MACHINE AND A RIVET SUPPLY THEREFOR

(57) Abstract

A portable riveting machine has a punch for driving rivets from a rivet carrier tape (7). The tape is contained within a supply (14) consisting of a single width of tape spirally wound about a central void (28) within a container (25). A cylindrical internal peripheral surface (29) of the container guides the outermost layer of the tape during discharge.



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A PORTABLE RIVETING MACHINE
AND A RIVET SUPPLY THEREFOR

This invention relates to a portable riveting machine and a rivet supply therefor.

Traditional riveting machines are large and difficult to transport but recently riveting machines have become available that are more compact and light in weight. An example of a modern riveting machine of this kind is described in European Patent Specification 0172171 by Nietek Pty. Ltd. and has an elongate body including a hydraulic cylinder mounted on the upper jaw of an interchangeable C-frame. The hydraulic cylinder operates a punch which drives successive rivets from a rivet carrier tape fed to the lower end of the body from a supply. A rivet upsetting die is mounted on the lower jaw of the C-frame beneath the punch.

The rivet carrier tape carries equally spaced rivets firmly held in a carrier tape of a resiliently flexible material. Tape feed and discharge tubes are mounted at opposite sides of the elongate body. The rivet carrier tape may be supplied from an overhead spool, through the feed tube and into the riveting head at the lower end of the elongate body. After each riveting operation the tape is indexed to advance the next rivet to the discharge position and the used tape is fed through the discharge tube.

Such continuous spool feed is disadvantageous in that portability is limited by the need to maintain a short distance between the spool and the upper end of the feed tube so as to prevent snagging and consequent misfeeding of the tape. It has been proposed to overcome this difficulty by replacing the feed and discharge guide tubes by an inverted U-tube holding a strip of rivets cut from a spool. Although the provision of a U-tube provides complete portability it has attendant disadvantages in that it increases the overall length of the riveting machine thereby preventing access into certain components, the weight of the machine is increased, the operator's view may be obstructed, the number of rivets remaining in the U-tube is not visible, and the U-tube holds relatively few rivets and therefore requires frequent reloading from a nearby spool which may become soiled.

It is an object of the present invention to obviate or mitigate the aforesaid disadvantages.

According to a first aspect of the present invention there is provided a portable riveting machine comprising a punch adapted to drive successive rivets from a rivet carrier tape fed thereto from a supply coil, characterised in that the supply coil is a single width of tape spirally wound about a central void within a container having an internal peripheral surface for guiding the outermost layer of the tape during discharge.

Preferably, the container is at least partially transparent to permit observation of the supply coil remaining therein.

According to a second aspect of the present invention there is provided a supply of rivet carrier tape for use in a portable riveting machine, comprising a single width of tape spirally wound about a central void within a container having an internal peripheral surface for guiding the outermost layer of the tape during discharge.

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

Fig. 1 is a front elevation of one embodiment of portable riveting machine in accordance with the invention;

Fig. 2 is a corresponding side view, and

Fig. 3 is a side view to an enlarged scale of a rivet carrier tape container and the machine holder into which it fits in use.

Referring now to the drawings, a portable riveting machine has an elongate body 1 including a hydraulic cylinder 2 and a riveting head 3. The body 1 is mounted on the upper jaw of a C-frame 4 by means of a locking frame 5 such that the riveting head 3 is positioned above a rivet upsetting die 6 mounted on the lower jaw of the C-frame 4. A rivet tape 7 is indexed through the riveting head 3 from a feed tube 8. The rivet tape 7 comprises a row of equally spaced rivets 9 held in a flexible carrier tape 10. Following ejection of the rivet 9 by the riveting head 3 the used carrier tape 10 is fed into a discharge tube 11. The rivets 9 are ejected from the tape 10 in the riveting head 3 by a punch (not shown) operated by the hydraulic cylinder 2. The force of the punch is sufficient to drive the rivets 9 at least partially through components to be joined and against the upsetting die 6.

As so far described, the construction and operation of the riveting machine is well known, for example from the European Patent cited above to which attention is directed for more detailed information. By contrast with the known riveting machine, the tape feed and discharge tubes 8, 11 are of reduced length and mounted at opposite sides of the machine body 1 on horizontal clamping bars 12, 13 of the lockable frame 5. A rivet supply 14 is held in a holder 15 mounted on the upper end of the feed tube 8 by means of a bracket 16 connected to a clamp 17. As seen in the inset to Fig. 1, the clamp 17 is in the form of a split sleeve with a hinge 18 at one side and a hand-tightenable fastener 19 at the opposite side. The clamp 17 may readily be slackened to permit pivotal movement of the holder 15 from the position shown in Fig. 1 to the positions at right angles thereto referenced 15' and 15'' in Fig. 2 or any intermediate position as required. Additionally, if the machine body 1 is turned about its longitudinal axis through 180° relative to the C-frame 4 thereby reversing the feed direction of the rivet tape 7, the clamp 17 may be removed from the tube 8 (which now becomes the discharge tube) and attached to the tube 11 (which now becomes the feed tube).

As best seen in Fig. 3, the holder 15 has generally U-shaped front and rear walls 20, 21 interconnected by side walls 22 and a floor 23 so as to provide a receiving pocket for the rivet supply 14. The floor 23 has a flared opening 24 (see also the inset to Fig. 1) registering with the tube 8.

The rivet supply 14 comprises a container 25 made from a square sheet 26 of stiff card material adhesively connected to a correspondingly shaped sheet 27 which is vacuum formed in clear synthetic plastics material to provide an annular cavity 28 defined by a generally cylindrical outer wall 29 and a central boss 30 of hollow frustoconical shape with a flat inner end wall 31 adhesively connected to the card sheet 26. The depth of the container 25, i.e. the axial dimension of the cylindrical wall 29, is only slightly greater than the width of the rivet tape 7. At a bottom corner of the rivet supply 14 the container wall 29 merges with an outlet stub 32. A single width of rivet tape 7 is spirally coiled within the container 25 about the central void or cavity 28. Before use, the leader 35 of the rivet tape 7 is attached by a short length of adhesive tape 33 to a bung 34

inserted into the outlet stub 32. When the bung 34 is removed to open the container 25 the leader 35 of the rivet tape 7 is pulled out of the container 25 so that it can be easily grasped by hand. At this stage the bung 34 and the adhesive tape 33 may be removed.

The rivet tape 7 is a parallel-sided strip of flexible synthetic plastics material with a central row of undersize holes in which are inserted the rivets 9 save at the leader 35 where the rivets are absent in order to permit the tape 7 to be threaded into the riveting head 3 at the start of the riveting operation. The rivets 9 are directed inwardly within the container 25. The coils of tape 7 are wound inwardly from the inner surface of the cylindrical wall 29 so as to leave the void 28 around the central boss 30. The coiled tape 7 is positioned within the container 25 before the plastics sheet 27 is closed by the card sheet 26 under the application of heat and pressure.

The rivet supply 14 is a snug fit in the holder 15 the internal width of which is only slightly larger than the overall thickness of the rivet supply 14. Before insertion into the holder 15 the rivet supply 14 is opened as described above, the adhesive tapes 33 and bung 34 are discarded and the exposed leader 35 is fed through the opening 24 and the feed tube 8 and threaded into the riveting head 3. As the rivet supply 14 is lowered into the pocket provided by the holder 15 the outlet stub 32 of the container 25 is received in the flared opening 24 immediately above the tube 8.

During normal operation of the riveting machine the tape 7 is automatically pulled out of the container 25 and is guided in its travel by the inner surface of the cylindrical wall 29. Because the container 25 contains only a single width of tape 7 the direction of feed of the tape 7 remains virtually constant. Also, the tensional force required to draw tape from the container is low because only the coiled tape is rotated during tape discharge. Frictional contact between the tape and the inner surface of the cylindrical wall 29 ensures that a consistent back tension is exerted on the rivet tape so increasing the reliability of the tape indexing mechanism in the riveting head 3. The container 25 enables a relatively large number of rivets to be accommodated in close proximity to the feed tube 8 and the length of tape remaining can readily be viewed by the operator

through the clear front wall of the container 25.

It will be appreciated that modifications and improvements may be made without departing from the scope of the invention. For example, the connection of the holder 15 to the feed tube 8 may permit pivotal movement of the holder 15 relative to the tube 8 without the need to first slacken and then re-tighten the fastener 19.

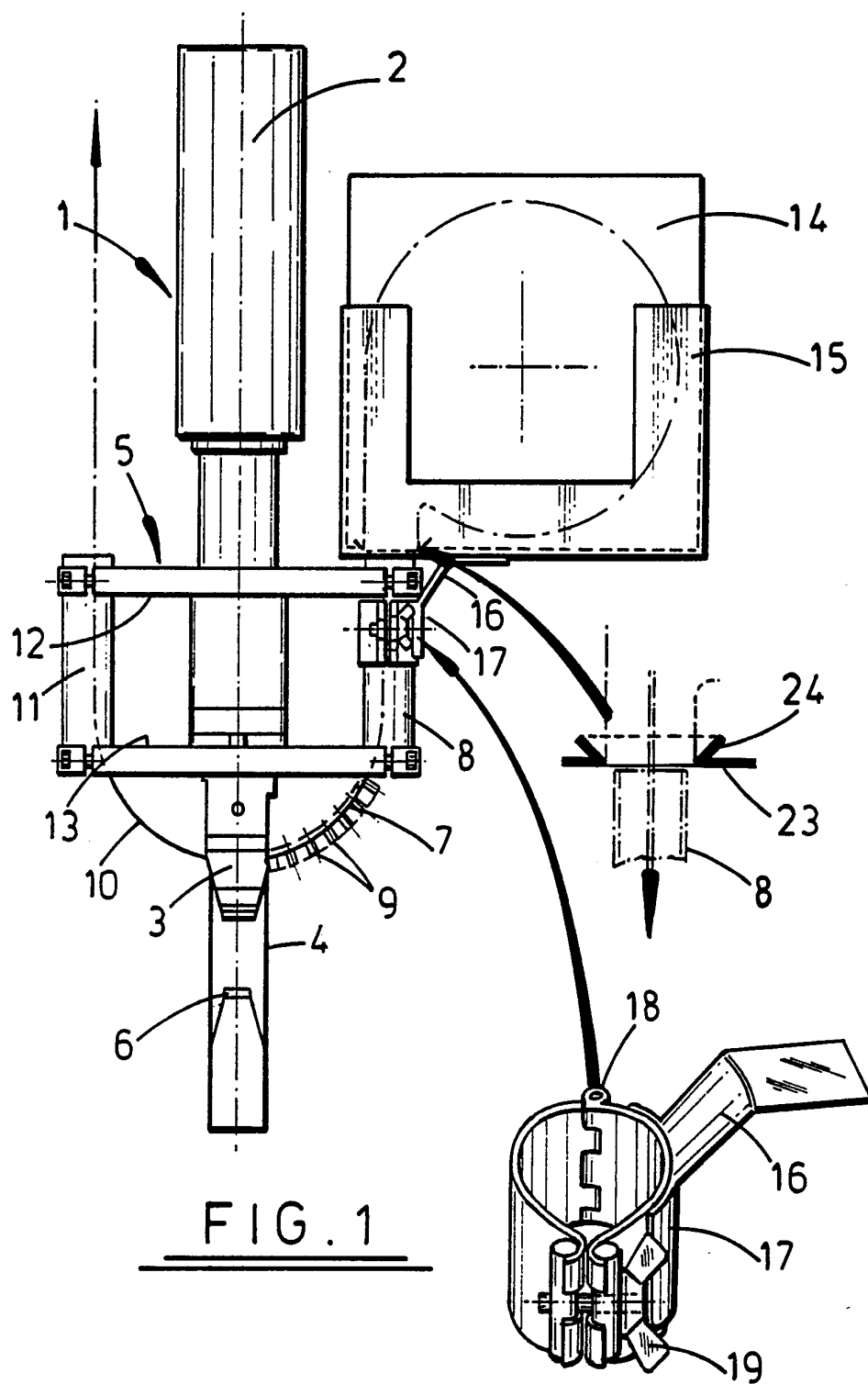
Used tape may be cut off at the riveting head, for example simultaneously with each riveting operation, and in this case the discharge tube may be omitted.

The holder for the tape container may hold two or more containers, one of which is in use and the other or others of which are available for subsequent use.

Although the description has been concerned with a portable riveting machine and a rivet supply therefor, the invention may be applied to other (preferably headed) fasteners and machines for applying such fasteners, and the specification should be construed accordingly.

CLAIMS:

- 1) A portable riveting machine comprising a punch adapted to drive successive rivets from a rivet carrier tape fed thereto from a supply coil, characterised in that the supply coil is a single width of tape spirally wound about a central void within a container having an internal peripheral surface for guiding the outermost layer of the tape during discharge.
2. A machine as claimed in claim 1, wherein the container is at least partially transparent to permit observation of the supply coil remaining therein.
3. A machine as claimed in claim 1 or 2, wherein the container is located in a holder pivotally mounted on the machine.
4. A supply of rivet carrier tape for use in a portable riveting machine, comprising a single width of tape spirally wound about a central void within a container having an internal peripheral surface for guiding the outermost layer of the tape during discharge.
5. A supply as claimed in claim 4, wherein the container is at least partially transparent to permit observation of the supply coil remaining therein.
6. A supply as claimed in claim 4 or 5, wherein said peripheral surface is partly cylindrical.
7. A supply as claimed in claim 6, wherein the container has an outlet including a rectilinear tangential extension of said cylindrical surface.
8. A supply as claimed in claim 7, wherein the outlet is closed by a removable closure to which the leading end of the tape is connected for withdrawal from the container when the closure is removed.



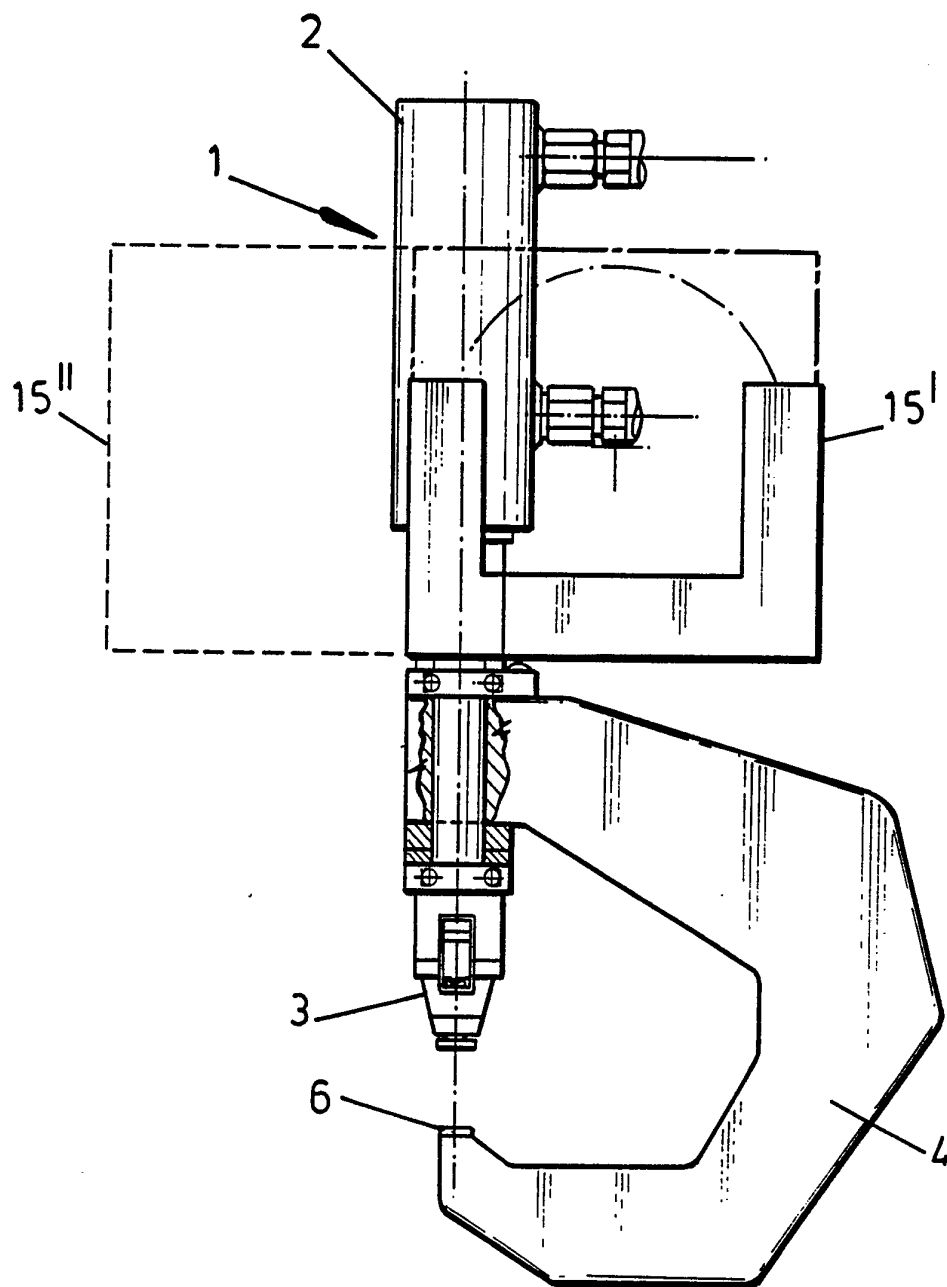
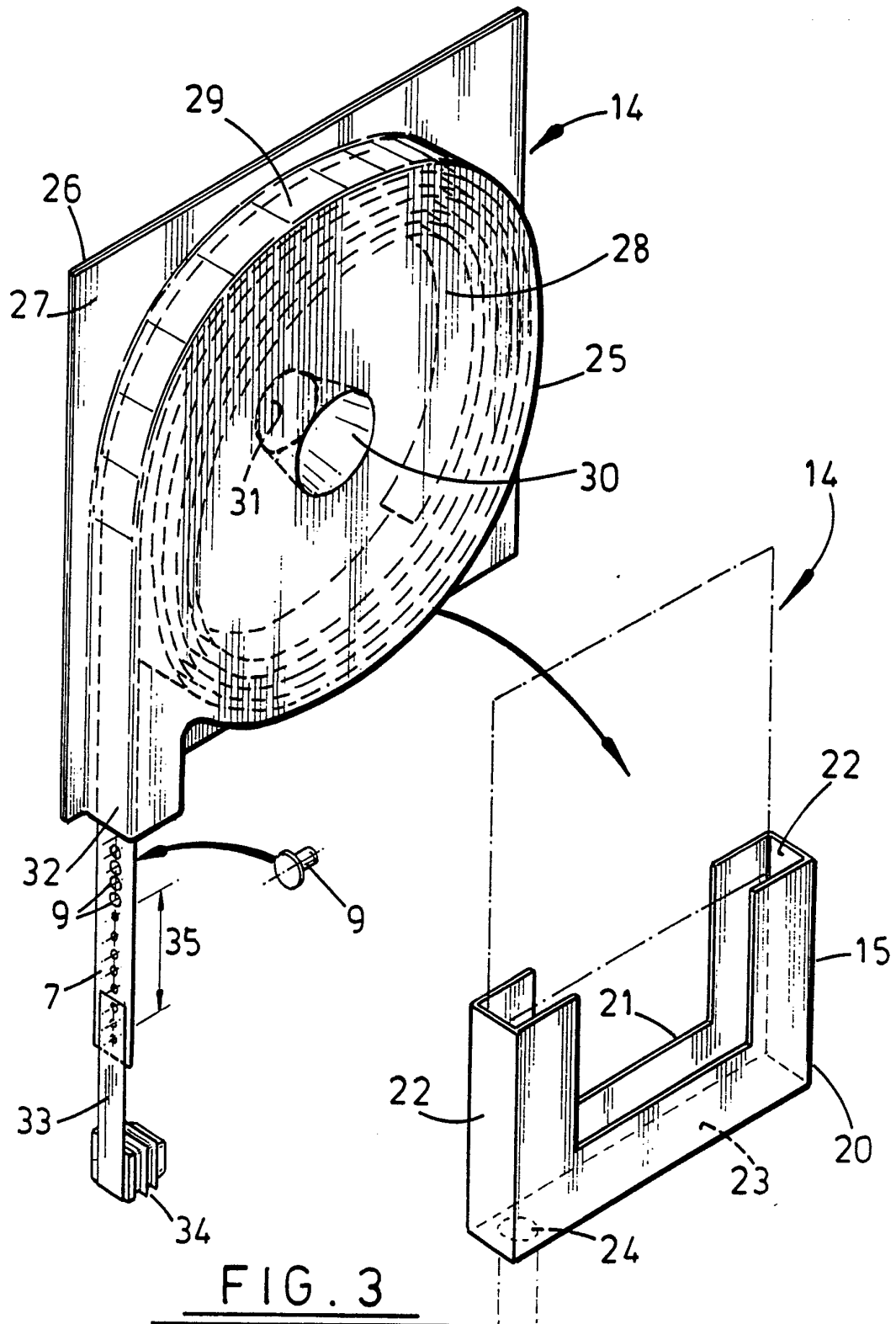


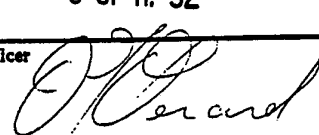
FIG. 2



INTERNATIONAL SEARCH REPORT

International Application No.

PCT/GB 92/01272

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) ⁶		
According to International Patent Classification (IPC) or to both National Classification and IPC		
Int.Cl. 5 B21J15/32		
II. FIELDS SEARCHED		
Minimum Documentation Searched ⁷		
Classification System	Classification Symbols	
Int.Cl. 5	B21J ; B25B	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched ⁸		
III. DOCUMENTS CONSIDERED TO BE RELEVANT⁹		
Category ¹⁰	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³
Y	WO,A,8 404 710 (FUHRMEISTER) 6 December 1984 cited in the application see claim 1; figures 1,2 ---	1,4,6,7
Y	FR,A,2 400 634 (A. RAYMOND) 16 March 1979 see page 6, line 26 - line 35; figure 1 ---	1,4,6,7
A	US,A,4 014 488 (POTUCEK) 29 March 1977 -----	
¹⁰ Special categories of cited documents : ¹⁰ "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published 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 "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. "&" document member of the same patent family		
IV. CERTIFICATION		
Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report	
28 OCTOBER 1992	06. 11. 92	
International Searching Authority	Signature of Authorized Officer	
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ANNEX TO THE INTERNATIONAL SEARCH REPORT
ON INTERNATIONAL PATENT APPLICATION NO. GB 9201272
SA 62906

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report.
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