THE JOINT EXAMINATION BOARD

PAPER P3

PREPARATION OF SPECIFICATIONS FOR UNITED KINGDOM AND OVERSEAS PATENTS

25th April, 1995

10.00 a.m. - 2.00 p.m.

Please read the following instructions carefully. This is a FOUR HOUR Paper.

1. In the appropriate boxes at the tope of each sheet please enter the designation of the paper, the question number, and your Examination number. Write on one side of paper only using BLACK ink. You must NOT staple pages together. You must NOT state your name anywhere in the answers.

2. NO printed matter or other written material may be taken into the examination room.

3. Answers MUST be legible. If the examiners cannot read a candidate's answer no marks will be awarded.

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PREPARATION OF SPECIFICATIONS FOR UNITED KINGDOM AND OVERSEAS PATENTS

25th April, 1995
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Your client, an ejector seat manufacturer, writes:

"Ejector seats in military aircraft are usually provided with restraint means which pull the limbs of the aircrewman occupying the seat into a safe position in which it is unlikely that limb flail and consequent breakage will occur when the seat and occupant meet the outside air at high speed.

In a typical such restraint system, a cord is attached at the cuff of each arm of the aircrewman's flying suit and passed up the exterior of the sleeve and down the torso part of the flying suit, in a Velcro tunnel, to the crotch region. On entering his seat, the crewman, in addition to attaching his man-to-seat harness, plugs the cord into a motor-driven reel device on the base of the seat. When ejection is initiated, the reel device reels in the cord, breaking it out of the Velcro tunnel and pulling the wrists into the crotch region. A similar system is used on the legs, arranged to bring the ankles against the seat base.

Although this restraint system works well for the crewman's legs, experience has sadly shown that, in certain configurations of the crewman's arms, which may well arise in the command ejection mode, arm breakage is not obviated by these means. In this mode, the aircrewman is ejected with little or no warning, by a colleague who has detected an emergency.

The accompanying figures show our proposal for a solution of this problem. In them, fig. 1 is a side view of the seat in its normal position, with two nets projecting sideways from the seat and attached to the sides of the cockpit, fig. 2 is a front view of half of the seat shewn in fig. 1, and fig. 3 is a side view of the seat with occupant after the ejection process has begun, but before the seat and crewman have left the aircraft.

As you can see, on each side of the seat is a substantially-triangular net 10 anchored to the back of the seat, extending from the seat portion 11 of the seat to the head box 12 which, as you know, contains the seat parachute. Each net is outstretched in the aircraft, with its outer apex 13 detachably anchored at one end of a slide 14 attached to the aircraft cockpit wall 15.

A cord or tape 16, attached to the apex 13 of the net and detachably anchored with Velcro both to the bottom edge of the net and, extending forwardly, to the side of the base of the seat (at 17), passes through a snubber block 18 (which allows the tape or cord to be pulled through it in only one direction, and not the other). It then passes over a pulley 19 frangibly anchored to the cockpit floor and thence to an anchor 20 on the seat base. Merely to attach the tape frangibly to the cockpit floor may not permit rapid-enough deployment of the net.

The word "net" is used here to indicate function rather than construction. However, preferably a reticulated (i.e. net-like) fabric is employed, to minimise wind resistance and weight but, particularly over the lower part of the net, the reticulations are not large enough for a man's finger to pass through them. The free edges of the net, particularly the lower edge, may be elasticated so as to keep the net relatively taut or to impart an element of "bagging" to the net.

Of course Velcro need not be employed to hold the cord: split plastics tubing and rupturable fabric attachments are among possible alternatives.

The slide 14 is disposed on the cockpit wall so as to control the deployment of the net. Thus it extends upwards and forwards in this, example, in which the net deployment is effected by the ejection of the seat. Upwards motion of the seat during ejection will pull on the cord or tape 16, freeing it from the Velcro attachments, sliding the net apex 13 out of the slide 14 and allowing the cord to be pulled towards the snubber block 18 to anchor the net apex against the seat (as shown in Fig.3). Continued ejection of the seat will break the frangible anchor of the pulley 19, freeing the cord from the aircraft.

In an alternative embodiment, the anchor 20 is replaced by a motorised reel, and the snubber block 18 by a guide. As this arrangement permits deploying the nets before ejection gets under way, the slide 14 in this embodiment extends substantially forwardly.

As you know, ejector seats incorporate automatic man/seat separation devices to unlock the aircrewman from all seat restraints at a certain period after the seat with crewman attached

has left the aircraft. If necessary, these separation devices can be arranged to release the nets as well.

Please would you obtain patent protection for our proposals."

On the basis of the above information, please draft:

1. A set of claims for a GB patent application (70 marks);

2. An abstract for a GB patent application (5 marks), and

3. The introduction to a European (EP) patent application up to, but not including, the statement of invention, and also including a European two-part main claim (25 marks).

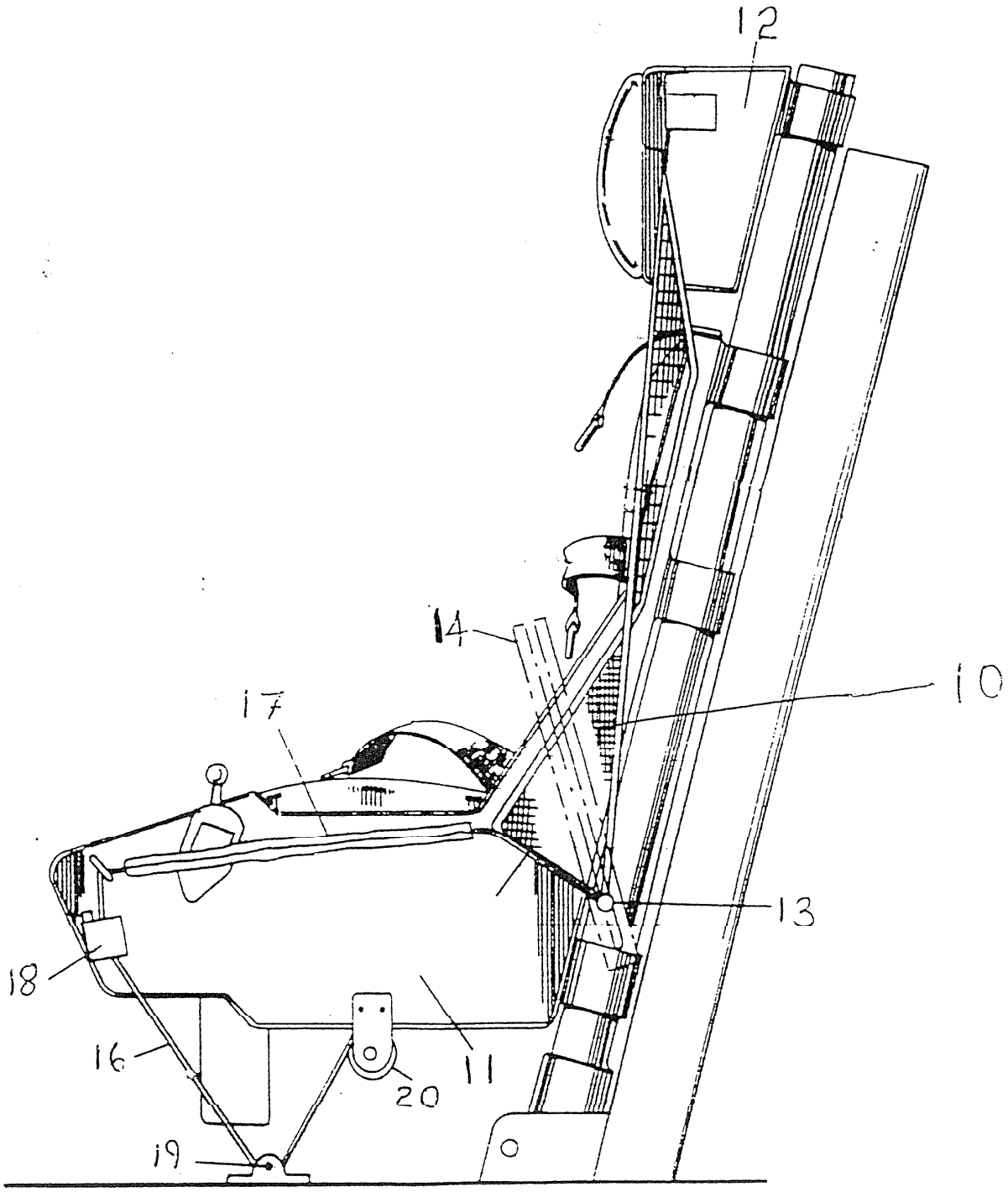

FIG. 1.

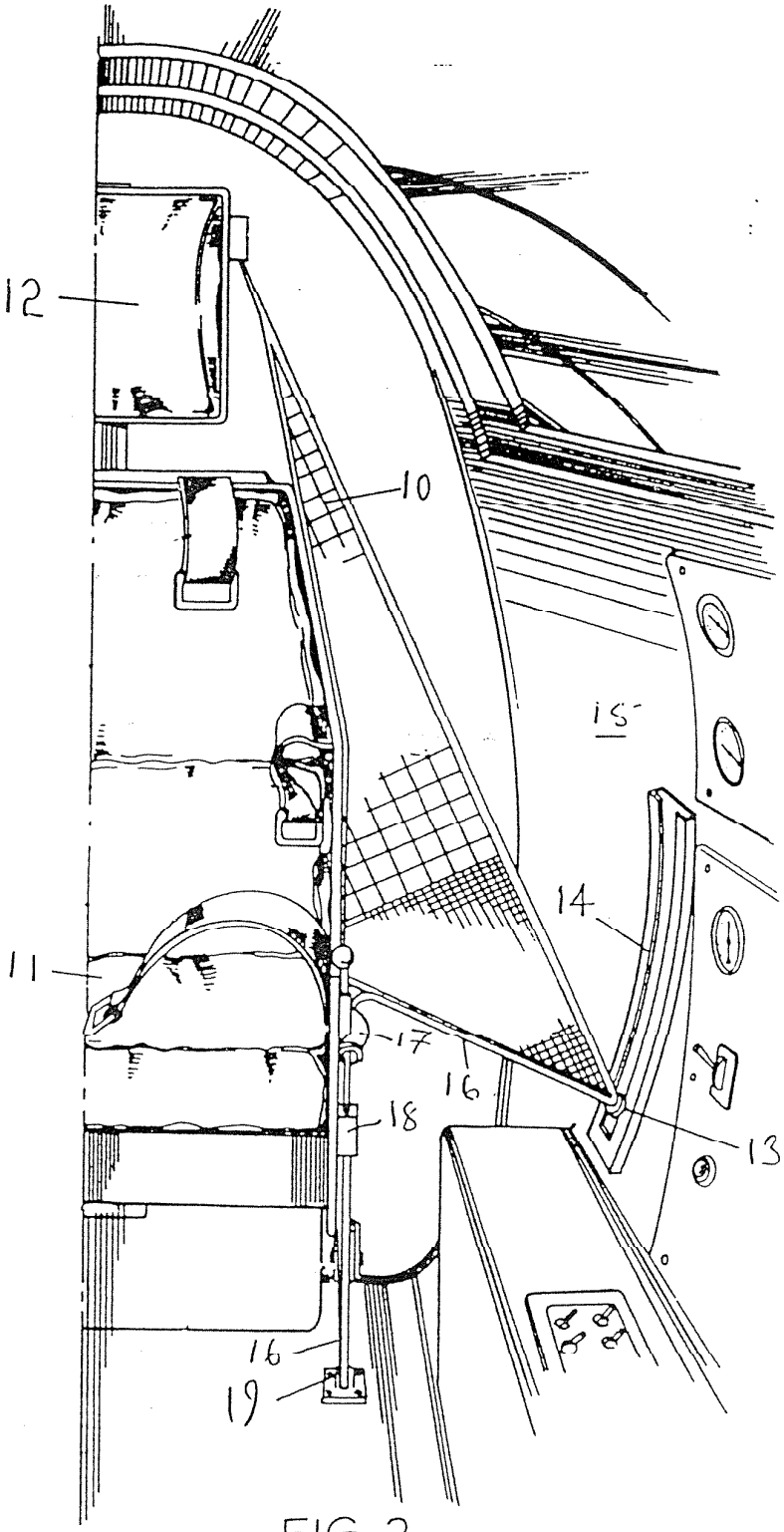

FIG. 2

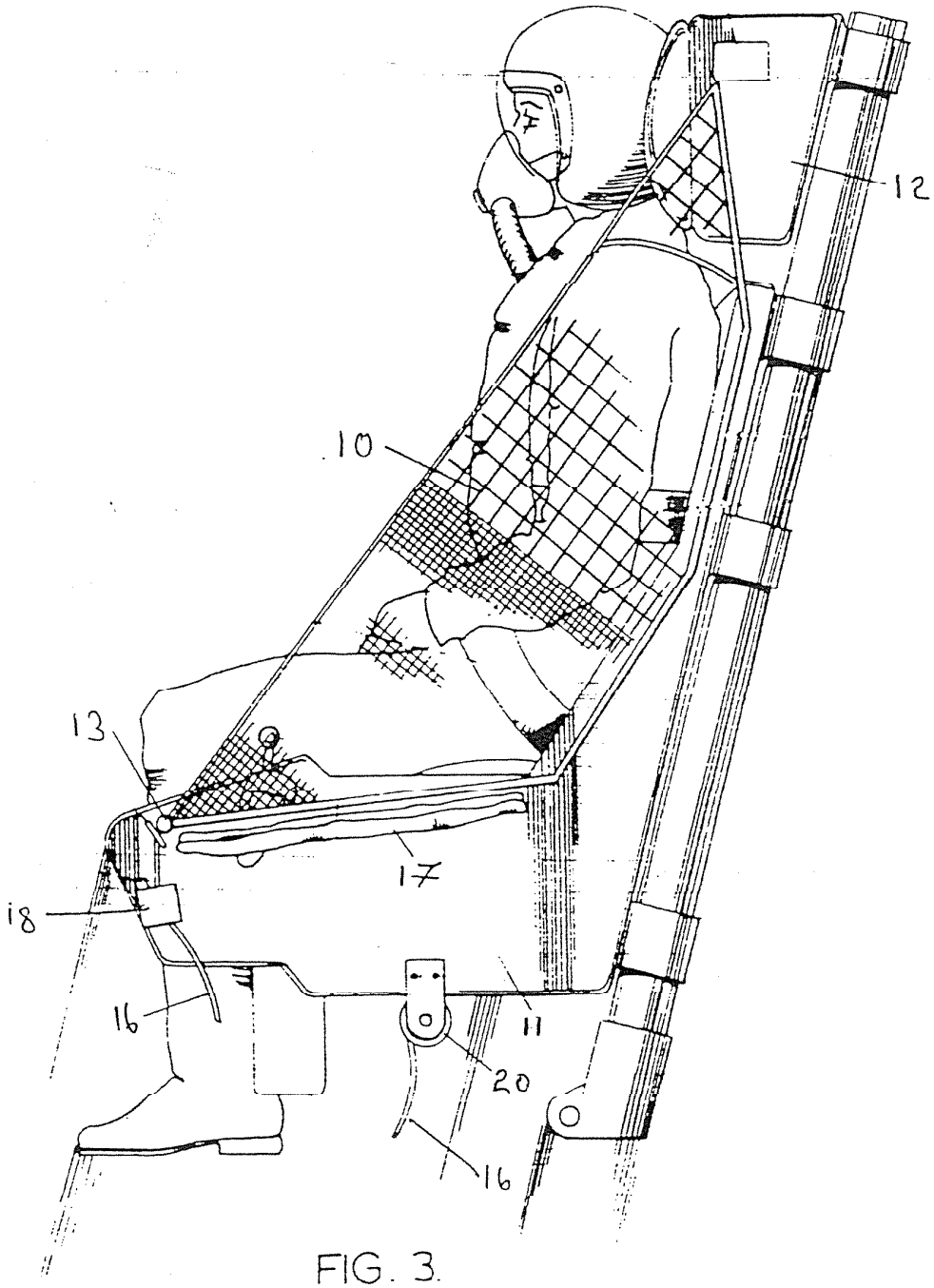

FIG. 3.