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The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 21

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte CHRISTOPHER E. COOMBS,
ROBERT J. RICHTER, RICHARD M. PEEL,
and ANDREW J. FORDHAM

Appeal No. 95-4152
Application 08/042,044¹

HEARD: November 6, 1998

Before MARTIN, BARRETT, and TORCZON, Administrative Patent Judges.

BARRETT, Administrative Patent Judge.

DECISION ON APPEAL

¹ Application for patent filed March 31, 1993, entitled "Combination Head-Protective Helmet And Thermal Imaging Apparatus."

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This is a decision on appeal under 35 U.S.C. § 134 from the final rejection of claims 1, 3-5, 7-14, 16-21, 23, and 24. Claims 2, 6, 15, and 22 have been canceled.

We affirm-in-part.

THE INVENTION

The disclosed invention is directed to a combination head-protective helmet and infrared camera and display.

Claim 1, the sole independent claim, is reproduced below.

1. Combination head-protective helmet and thermal imaging apparatus for being worn by a person in a heated environment where stratified heat is present which increases vertically, comprising:

a head-protective helmet including a cap and an outwardly extending brim and wherein upon said head-protective helmet being present in said stratified heat an envelope of reduced heat is present underneath said brim;

thermal imaging apparatus including an infrared sensor camera for producing an infrared image of a scene or object and display apparatus which generates a visible image of said scene or object from said infrared image for viewing by a person wearing said combination;

first mounting means for mounting said camera to said head-protective helmet generally underneath said brim to protect said camera from falling objects striking said helmet and to cause said camera to reside in said envelope of reduced heat to reduce the influence of said heated environment on said camera; and

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second mounting means for mounting said display apparatus to said helmet in a position to permit said person to see said visible image.

THE REFERENCES

The examiner relies on appellants' admission that shrouds are well known for protecting the ears of the fire helmet wearer from heat and flames (specification, page 12, lines 10-13) and on the following prior art patents:

Rodway	4,301,998	November 24, 1981
Burbo et al. (Burbo)	4,49,787	May 22, 1984
Eckstein et al. (Eckstein)	4,821,711	April 18, 1989
Hanson et al. (Hanson)	4,970,589	November 13, 1990
Moss et al. (Moss)	5,035,474	July 30, 1991
Hamilton	5,036,841	August 6, 1991
Coombs	5,044,016	September 3, 1991

THE REJECTIONS

Claims 1 and 7 stand rejected under 35 U.S.C. § 103 as being unpatentable over Hanson.

Claims 3-5, 9, and 17 stand rejected under 35 U.S.C. § 103 as being unpatentable over Hanson, Coombs, and the admitted prior art that shrouds are well known.

Claims 8, 13, 14, and 18 stand rejected under 35 U.S.C. § 103 as being unpatentable over Hanson and Burbo.

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Claims 10-12, 19-21, and 24 stand rejected under 35 U.S.C. § 103 as being unpatentable over Hanson and Moss.

Claim 16 stands rejected under 35 U.S.C. § 103 as being unpatentable over Hanson, Coombs, and Rodway.

Claim 23 stands rejected under 35 U.S.C. § 103 as being unpatentable over Hanson, Hamilton, and Eckstein.

We refer to the Office action entered May 5, 1994 (Paper No. 8) and the Examiner's Answer (Paper No. 14) (pages referred to as "EA__") for a statement of the examiner's position and to the Brief (Paper No. 13) (pages referred to as "Br__") (pages referred to as "RBr__") for appellants' position.

OPINION

Information Disclosure Statement

The Information Disclosure Statement received April 13, 1998, has not been considered by the examiner. It is noted that two documents, Fire Engineering, March 1993, page 35, and Firehouse, March 1993, page 87, show an infrared imaging system by Cairns & Brother, Inc., the assignee of the present application, which has a helmet mounted infrared sensor camera and display. It is assumed that those documents

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represent the inventors' own work and, thus, do not constitute prior art.

Grouping of claims

Appellants state under the Grouping of Claims that "[t]he presumption set forth in 37 C.F.R. 1.92(c)(5) [sic, 1.192(c)(5)] is correct with regard to the rejected claims" (Br17). Nevertheless, appellants proceed to argue all of the claims in each ground of rejection individually. Since the examiner has treated all the claims, we consider the claims individually.

Claims 1 and 7 -- Hanson

Initially, there are several matters of claim interpretation with respect to claim 1. First, the preamble limitation "for being worn by a person in a heated environment where stratified heat is present which increases vertically," is considered a statement of environment or intended use for the apparatus and not a structural limitation. Second, the limitation "wherein upon said head-protective helmet being present in said stratified heat an envelope of reduced heat is

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present underneath said brim" is considered to recite a known inherent property of any helmet with a brim when worn in a heated environment where stratified heat is present because the only structure recited to perform the limitation is the brim. Also, the specification states (page 11): "as further known to those skilled in the art, an envelope of reduced heat is present underneath the helmet brim 14" Third, claim 1 does not specify any particular structure for the helmet, except that it has a cap and brim; e.g., it does not state that the brim extends on all sides of the cap or how far out the brim extends. Fourth, we interpret the limitation "generally underneath said brim . . ." broadly to require that only a part of the camera has to be protected by the brim; i.e., we do not interpret "generally underneath" to require the camera to be substantially or completely underneath the brim. This interpretation is consistent with appellants' figure 1, which shows the camera 16 mounted to the edge of the brim and extending outward therefrom. This interpretation is also consistent with claim 9, which recites a curved protective shield "to further protect said camera from said falling objects and to shield said camera from stratified

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heat" as shown by shield 100 in figure 9, because claim 9 further limits claim 1 to add further protection. Fifth, claim 1 does not recite any details of the display, so the display can be for one eye or two and can be any kind of display. Sixth, although claim 1 recites that the display and camera are mounted "to said helmet," the "helmet" is not necessarily the hard shell, but can be an inner helmet liner (e.g., the "inner deformable cap" in claim 3 or the "shroud" mounted to the inner deformable cap in claim 4). Seventh, there is no recitation that the camera is located to the side of the user's face.

Hanson discloses a head mounted video display coupled with a camera which may be remotely located (e.g., "on a weapon, a vehicle or also on a tripod," col. 9, lines 57-58) or head mounted. A head mounted camera can be mounted to the top of a helmet, as shown in figures 3 and 12, or to a face frame as shown in figure 9. Figure 2 of Hanson shows attachment of a display 14 to a helmet 40 with a strap 42. Figure 6 of Hanson shows a particular display arrangement with the display screen 44 formed integral with the video display 14 and mounted for rotation about screw 67. "The

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display screen 44 and the display unit 14 can be rotated upwardly out of the line of sight of the soldier. Display screen 44 is transparent so the soldier may see through the screen when he is not focussing on images on the screen." (Col. 6, lines 46-50). The various mounting arrangements in Hanson would have taught one of ordinary skill in the art that a camera/display could be mounted directly to a helmet or could be mounted to headgear underneath a helmet. "According to various embodiments of the invention, the video camera may be responsive to visible light, infrared radiation, thermal radiation or other particular radiation properties of the environment which enable an accentuated view of the scene or situation." (Col. 2, lines 12-17; see also col. 9, lines 1-2.) Therefore, Hanson teaches one of ordinary skill in the art that any of the cameras or night vision equipment can be an infrared sensor camera as claimed. Hanson states (col. 15, lines 37-39): "The invention may find a variety of applications in the civilian environment, such as in news reporting, fire fighting or law enforcement." Therefore, it would have been obvious to employ the system of Hanson in a fire fighting environment where stratified heat is present.

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The specific claim limitation at issue is "first mounting means for mounting said camera to said head-protective helmet generally underneath said brim to protect said camera from falling objects striking said helmet and to cause said camera to reside in said envelope of reduced heat to reduce the influence of said heated environment on said camera." In our opinion, this limitation would have been suggested to one of ordinary skill in the fire fighting and head mounted camera/display art by the teachings of Hanson as a whole. First, regarding the location of the camera under the brim. Figure 9 teaches a face frame 94 (somewhat like a diver's mask) including an outwardly extending shell 96 which houses and protects the night vision equipment 90 and video display 88 (col. 8, lines 1-11). It was taught in Hanson to replace the night vision equipment with a thermal or infrared sensitive unit (col. 2, lines 13-17; col. 9, lines 1-2). The camera equipment 90 is considered to be mounted "generally underneath said brim" because it appears to have the same relationship to the user's eye and the helmet brim as the display 104 shown in figure 11; note that the examiner states that "figure 9 discloses night vision camera 90 approximately

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located where element 104 is in figure 10" (EA14). Thus, Hanson discloses a camera located under the brim of a helmet. In addition, appellants admit that "as further known to those skilled in the art, an envelope of reduced heat is present underneath the helmet brim 14" (specification, page 11) upon a fire helmet being present in a heated environment. Appellants argue that they "are the first to discover that a heat-sensitive infrared imaging camera can be mounted under the brim of a head-protective helmet to reside in an envelope of reduced heat to reduce the influence of the heat on the camera" (Br18). In our opinion, however, it would have been common sense to one skilled in the art to mount an electronic camera underneath the helmet brim in a known envelope of reduced heat to take advantage of the reduced heat. A conclusion of obviousness may be made from common knowledge and common sense of the person of ordinary skill in the art without any specific hint or suggestion in a particular reference. In re Bozek, 416 F.2d 1385, 1390, 163 USPQ 545, 549 (CCPA 1969).

Second, regarding the mounting of the camera and display "to said helmet," the sensor equipment 90 and display 88 in

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figure 9 of Hanson are mounted to a face frame 94 which attaches to the head by a strap 98 underneath the helmet, rather than to the helmet directly. In our opinion, one skilled in the art would have appreciated from the other teachings in Hanson that an alternative means of attaching the face frame to the head would have been to mount it to the helmet, for example, using a strap fixed to the helmet as shown in figure 2, a pivotable band as shown in figures 6 and 12, or to headgear as shown in figures 10 and 11. Also, it is noted that mounting "to said helmet" does not require mounting to the hard outer shell of the helmet. Dependent claim 3 recites that the camera and display are mounted on an inner deformable cap which is separable from the outer shell of the helmet. The strap and headgear for mounting the camera and display in Hanson might, therefore, be broadly construed to be part of the helmet because they are closely associated with the helmet in much the same way as appellants' removable inner cap is associated with the rigid outer cap. For these reasons, we conclude that mounting the camera and display to the helmet in Hanson would have been obvious.

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Appellants make two arguments with respect to the examiner's statement that "fig. 10 of Hanson suggests, and thus teaches, the attachment of the camera under the brim" (Paper No. 8, page 2; similar statement at EA3). First, appellants state that "the Hanson video monitor or display 104 is mounted to the head gear 102" (Br19). It is true that figures 8-11 of Hanson show displays and night vision equipment mounted to a face frame or headgear worn under a helmet. However, as discussed supra, one of ordinary skill in the art would have considered it an obvious modification to mount the equipment to the helmet itself or to make the mount part of the helmet in view of the other embodiments of Hanson, such as figures 2, 6, and 12. In addition, appellants disclose and claim that the camera and display do not have to be mounted to the outer hard shell of the helmet, but can be mounted to a removable inner deformable cap as recited in dependent claim 3. The strap and headgear for mounting the camera and display in Hanson might be broadly construed to be part of the helmet.

Second, appellants argue that the "video display or monitor extends outwardly from and forwardly of the face of

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the wearer of the head gear 102" (Br19) and, as shown in figure 11, "is not mounted underneath the brim of the Hanson helmet 40" (Br20). Appellants do not argue that figures 10 and 11 do not show a camera. Appellants do address figure 9, which shows equipment 90 which could be an infrared video camera, in their arguments. We find that the night vision equipment 90 in figure 9 is intended to be mounted in the same relative position to the user's eye and the helmet as the display 104 in figure 11. The display 104 is "generally underneath said brim" because it is located mostly underneath the brim of the helmet 40. Also, the face frame "includes an outwardly extending shell 96 which houses the video display 88 and night vision equipment 90" (col. 8, lines 2-4) and the display 88 and equipment 90 "are thereby protected" (col. 8, lines 6-7). The outwardly extending shell of the face frame forms an extension of the helmet brim. In addition, as discussed supra, it would have been a matter of common sense to one skilled in the art to locate a camera under the helmet brim where there is known to exist an envelope of reduced heat.

For these reasons, the rejection of claim 1 is sustained.

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In regard to claim 7, the examiner finds that "Hanson teaches a camera attached to the helmet under the brim which is pivotal in the horizontal and vertical directions for inherent directional adjustment purposes" (Paper No. 8, page 3; EA4). Appellants argue that the examiner erred. Appellants argue that figures 10 and 11 show cantilever mounting and "[c]antilever mounting obviously is mounting for pivoting in the vertical direction and not the horizontal as stated by the Examiner" (Br22). We agree with appellants that Hanson does not mount the camera for rotation in the horizontal direction. The examiner responds to appellants' argument by stating that "the basis of the rejection is that it would have been obvious to pivotally attach the camera to the helmet for the purpose of aligning the sight of the camera to a desired line of sight" (EA13). This reasoning changes the basis of the rejection for the horizontal rotation from it being taught in Hanson to it being obvious over Hanson. Since the cameras in Hanson are either mounted on the centerline of the helmet (figure 12) or mounted in front of the user's eye (figure 9), there is no need for horizontal rotation because the cameras look straight ahead. Appellants' camera is

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mounted to the side of the user's head and requires horizontal rotation to view in front of the user, although the location of appellants' camera is not claimed. The examiner has failed to establish a prima facie case of obviousness for the horizontal rotation limitation. The rejection of claim 7 is reversed.

Claims 3-5, 9, and 17 -- Hanson, Coombs, and admitted prior art

Claim 3 recites that the helmet comprises an outer hard shell and a removable inner deformable cap and that the camera and display are mounted to the removable inner cap. Hanson discloses that the camera/display system can be used in a fire fighting environment (col. 15, line 39). Coombs discloses a fire fighter's helmet with a removable inner deformable cap. One of ordinary skill in the art would have been motivated to use a known fire helmet such as Coombs in adapting the camera/display system of Hanson to a fire fighting environment. Hanson discloses that a camera and display may be mounted to a face frame, which attaches to the head with an adjustable strap 98 underneath the helmet 40. Hanson also

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discloses in figures 10 and 11 that a display 104 can be mounted to headgear 102 which is worn under the helmet. In our opinion, one of ordinary skill in the art seeking to mount the camera/display system of Hanson to a fire fighter's helmet as shown in Coombs would have been motivated to attach the camera/display system to the inner removable cap part of the helmet because of the similarity to mounting with a strap or to headgear taught by Hanson.

Appellants argue that "Coombs . . . neither teaches nor suggests a thermal imaging system including an infrared sensor camera" (Br23). The rejection relies on Hanson for the camera. Appellants argue that "nowhere in the combined disclosures of Hanson and Coombs will one of ordinary skill in the art find teaching or suggestion of mounting an infrared camera under the brim of either the helmet of either Hanson or Coombs so as to reside in an envelope of reduced heat and would find neither teaching nor suggestion of mounting an infrared camera on the Coombs inner deformable cap" (Br23-24). It has been discussed with respect to claim 1 why Hanson teaches mounting a camera under the brim of a helmet in an envelope of reduced heat. As to mounting the camera/display

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to the inner deformable cap of Coombs, such would have been suggested to one of ordinary skill in the art by the mounting of the camera/display to a strap or headgear worn underneath the hard helmet in Hanson. Therefore, we sustain the rejection of claim 3.

Claim 4 recites mounting the camera to a shroud removably mounted to the inner deformable cap. Neither Hanson nor Coombs teaches a shroud, much less a removable shroud. The examiner relies on appellants' admission that shrouds are well known for protecting the ears of the fire helmet wearer from heat and flames (specification, page 12, lines 10-13). However, the specification does not admit that known prior art shrouds were removably mounted to the inner deformable cap as recited in claim 4. Accordingly, the examiner has failed to establish a prima facie case of obviousness for the removable shroud of claim 4. The rejection of claims 4 and 5 is reversed.

Claim 9 recites a curved protective shield mounted to the brim and extending outwardly and downwardly over at least a portion of the camera to further protect it from falling objects and stratified heat (see figures 9 and 10). Claim 9

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supports our interpretation of claim 1 that the camera being mounted "generally underneath said brim" does not require the camera to be completely underneath the brim. Hanson discloses that the face frame of figure 9 "includes an outwardly extending shell 96 which houses the video display 88 and night vision equipment 90" (col. 8, lines 2-4) and display 88 and equipment 90 "are thereby protected" (col. 8, lines 6-7). Although the protective face frame 94 in Hanson is not mounted to the helmet brim, it extends the brim of the helmet as shown in figure 9 to further protect the display 88 and equipment 90. In our opinion, the face frame in Hanson would have suggested providing an additional protective shield of appropriate shape to cover a camera or display. Further, one of ordinary skill in the art would have considered it an obvious modification to mount the face frame to the brim of the helmet in view of, for example, figures 6 and 12 of Hanson which disclose pivotally mounting a display screen 44 and display unit 14 to the side brim of a helmet. Appellants argue that Coombs does not suggest that his shield 18 is for protecting a camera (Br24). However, we conclude that Hanson

suggests providing an additional shield for the camera. The rejection of claim 9 is sustained.

Claim 17 recites that the display apparatus is mounted to a transparent face shield which is pivotally mounted to the helmet. Figure 6 of Hanson shows a particular display arrangement with the display screen 44 formed integral with the video display 14. "The display screen 44 and the display unit 14 can be rotated upwardly out of the line of sight of the soldier. Display screen 44 is transparent so the soldier may see through the screen when he is not focussing on images on the screen." (Col. 6, lines 46-50). The transparent display screen 44 functions both as a display and a face shield. Figure 12 shows the same display apparatus with night vision equipment 121 mounted on the top of the helmet. Therefore, Hanson discloses the display limitations of claim 17 and it is not necessary to rely on Coombs. In our opinion, it would have been obvious to one of ordinary skill in the art to combine the pivotally mounted display/face shield of figures 6 and 12 with an infrared camera mounted in front of the eye and below the helmet brim as shown in figure 9 because this involves only simple mechanical mixing

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and matching of display/camera mounting alternatives.

Alternatively, when using the system of Hanson in a fire fighting environment as suggested at column 15, line 39, using a helmet with transparent shield as shown in figure 1 of Coombs, the shield would naturally tend to cover a display/camera system like that in figure 9 of Hanson.

Appellants argue (Br25) that figure 9 of Hanson, relied on by the examiner, does not show a face shield and that Coombs does not suggest mounting a display apparatus to the face shield.

While the examiner's rejection could have been more persuasively reasoned, we conclude that claim 17 would have been obvious over Hanson and Coombs for the reasons stated. The rejection of claim 17 is sustained.

Claims 8, 13, 14, and 18 -- Hanson and Burbo

Claim 8 recites that the display is mounted for movement in the horizontal and vertical directions (not horizontal and vertical rotation as in claim 7). Hanson discloses a display 104 in figure 10 which is mounted for rotation in the vertical direction around pivotal connection 108. The examiner applies Burbo. Burbo discloses mounting for a night

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vision display which "contains adjustment mechanisms for tilt adjustment, eye relief, and interpupillar adjustment" (col. 7, lines 29-31). The tilt adjustment (figure 2) is for movement in the vertical direction and the eye relief (figure 8) and interpupillar adjustment are for movement in the horizontal direction. In addition, the mounting assembly can be adjusted in the vertical direction in the visor slot 14 (e.g., col. 6, lines 59-68). We agree with the examiner's conclusion that it would have been obvious to one of ordinary skill in the art to provide adjustments of the sensor camera in Hanson in view of the adjustments taught in Burbo. Appellants argue that "Burbo merely teaches horizontal and vertical adjustment mounting of vision equipment but adds nothing to Hanson with regard to suggesting the mounting of an infrared sensor camera underneath the brim of a helmet" (Br25-26). Thus, appellants essentially argue that claim 8 is patentable because it depends on claim 1. Since we conclude that claim 1 is unpatentable, we sustain the rejection of claim 8.

Claims 13 and 14 recite that the centerline of the display is displaced downwardly at an angle between 0E to about 10E. Hanson shows a pivotal connection 108 for a

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display 104 in figures 10 and 11, so the centerline of the display could be displaced, but does not describe displacing the centerline of the display. Burbo discloses that the display can be tilted "between +10E and -14E" (col. 8, lines 33-34). We agree with the examiner's conclusion that it would have been obvious to one of ordinary skill in the art to adjust the centerline of the display in Hanson downward in view of the adjustments taught in Burbo. Appellants argue that "Burbo only discloses the specific limitations of dependent Claims 13 and 14 and does not add anything to the disclosure of Hanson, because Burbo neither teaches nor suggests the mounting of an infrared sensor camera underneath the helmet brim to reside in an envelope of reduced heat as recited in Claim 1 on which these dependent claims depend" (Br26). Thus, appellants essentially argue that claims 13 and 14 are patentable because they depend on claim 1. Since we conclude that claim 1 is unpatentable, we sustain the rejection of claims 13 and 14.

Claim 18 recites that the display is mounted to the helmet with "elastic or adjustable straps." Appellants argue that the examiner erred in stating in Paper No. 8 that Burbo

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teaches an adjustable strap in figure 5 (Br26). Appellants argue that "Burbo does not disclose an adjustable strap but instead discloses adjustable mechanical mounting means" (Br26). The examiner responds that the argument is not persuasive because "the element in figure 5 of Burbo is functionally equivalent" (EA15). The limitation "elastic or adjustable straps" does not require an elastic strap. In our opinion, the mounting assembly 15 which adjustably mounts the display to the visor slot 14 (col. 6, line 59 through col. 7, line 28) can be broadly construed as an "adjustable strap" because this limitation says nothing about the strap going around the head or being non-rigid. In addition, Hanson teaches mounting the display to the helmet with a strap 42 in figure 2 and mounting the display to the head with an "adjustable strap 98" (col. 8, line 8) in figure 9. In our opinion, it would have been obvious to one of ordinary skill in the art to attach the adjustable strap 98 in figure 9 to the helmet in view of the teaching of mounting the strap 42 to the helmet in figure 2. The rejection of claim 18 is sustained.

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Claims 10-12, 19-21, and 24 -- Hanson and Moss

Claims 10-12 recite the details of the camera and display optics shown in appellants' figures 3-5. The examiner finds that Moss teaches the claimed arrangement and concludes (Paper No. 8, page 7; EA8): "since the internal structure or [sic, of] the display apparatus and optical system [of Hanson] were not specifically disclosed, it would have been obvious to one skilled in the art to utilize the teachings of Burbo [sic, Moss] to implement the conventional and well known internal structure of the display apparatus and optical system to provide a display for common stereoscopic^[2] viewing." We agree with this reasoning.

Appellants state (Br27):

While Appellants agree with the Examiner's statement of the disclosure of Moss in Paper 8, Appellants submit it was error for the Examiner to hold that the combined elements recited in Claims 10-12 as dependent on Claim 1 are obvious over the combined references of Hanson and Moss. Appellants have shown Claim 1 to be unobvious in

² The use of the term "stereoscopic" appears erroneous. "Stereoscopic" implies combining two different pictures of the same scene from slightly different points to produce a three-dimensional effect. Since Moss apparently uses images from a single object source, it cannot produce a stereoscopic effect. The correct word was probably "binocular," which is widely used in Moss. This misstatement does not affect the rejection.

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view of Hanson and Moss adds nothing to Hanson with regard to teaching or suggesting the mounting of an infrared sensor camera underneath the brim of a helmet to reside in an envelope of reduced heat.

Thus, appellants do not contest the examiner's obviousness rationale, but essentially argue that claims 10-12 are patentable because they depend from claim 1. Because we conclude that claim 1 would have been obvious over Hanson and agree with the examiner's conclusion that the subject matter of claims 10-12 would have been obvious in view of Moss, the rejection of claims 10-12 is sustained.

Claims 19-21 recite a counterbalance on the helmet opposite to the camera. The examiner concludes that counterbalance is suggested by the following statement in Moss (col. 1, lines 58-62): "Also the distribution of components of a helmet mounted display is an important consideration, since the moments of inertia with respect to the wearer's spine should be minimized in order to avoid wearer discomfort and fatigue." However, Moss discloses that "the heavier components of the system are mounted symmetrically close to the wearer's head, thereby minimizing both the weight and the inertial moment of the overall display which is added to the helmet" (col. 5, lines 2-6)), rather than using a

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counterweight to balance the display or camera. The examiner has failed to establish a prima facie case of obviousness with respect to the counterbalance limitation. The rejection of claims 19-21 is reversed.

Although the rejection of claim 12 has been sustained because it is not argued separately, we also consider it on the merits because of the similarity to claim 24. Claim 12 recites that real view field angle of the camera is substantially equal to the virtual image field angle of the virtual image from the display, "whereby said virtual images of said scene or object are substantially the same as the size of said scene or object of [sic] which said camera produces [of] said infrared image." The "real view field angle" is the angle 23 subtended at the camera 16 by the scene 22 in appellants' figure 2 and the "virtual image field angle" is the angle 61 subtended at the viewer's eye by the virtual image 22A in figure 6. Claim 24 recites that real field angle of view of the camera is substantially equal to the virtual image field angle of view produced by the eyepieces, "whereby the magnification ratio of these field angles is substantially unity to provide said person wearing said combination with

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scene imagery substantially the same size as said scene would be viewed in the real world." The "whereby" clause in claim 24 is interpreted to limit the structures which produce equal angles of views to those where the camera has a real field angle of view which produces an image the same as the image viewed by a person. Claim 12 does not require that the unity magnification ratio "provide said person wearing said combination with scene imagery substantially the same size as said scene would be viewed in the real world" as in claim 24. The term "real view field angle" in claim 12 is interpreted broadly to mean the view of the real world as seen by the camera, not that the angle of view of the camera is the same as the angle of view of a human. Having said this, the distinction does not matter to the rejection.

Moss discloses (col. 3, lines 48-52): "The helmet visor display of the present invention provides a field of view which is 30E in elevation by 40E in azimuth with full overlap between the two images fields displayed on the visor, hence, both eyes view the same image. Moss further discloses (col. 4, lines 1-2): "The display field of view is closely matched to the normal horizontal field of view." We interpret

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"normal horizontal field of view" to be the normal field of view of a human viewer and, therefore, we find Moss that teaches unity magnification.

The examiner finds that "the 1:1 magnification is inherent since any other ratio would disorient the wearer and thus create a dangerous situation, especially if the system is to be used by a firefighter, soldier, or pilot" (EA8-9). "The mere fact that a certain thing may result from a given set of circumstances is not sufficient [to establish inherency.]" In re Oelrich, 666 F.2d 578, 581-82, 212 USPQ 323, 326 (CCPA 1981) (citations omitted) (emphasis added). We agree with appellants that nothing prevents a system from having different magnifications. For example, a system could use a camera with a telephoto lens having a narrow field of view compared to the fixed field of view of the display. However, we find that Moss expressly discloses unity magnification. In addition, treating the examiner's inherency arguments as obviousness arguments, we believe that unity magnification would have been obvious to one having ordinary skill in the human factors art for the reason stated by the examiner: a fire fighter or other person using the display from the camera

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as a substitute for his or her own vision would need the virtual image to match the real view image as closely as possible to be able to walk around and function successfully. For the reasons stated above, we sustain the rejection of claims 12 and 24.

Claim 16 -- Hanson, Coombs, and Rodway

Claim 16 recites fire protective insulated jackets for covering the camera and the display. The examiner finds that Rodway teaches a thermally insulated jacket 109 for protecting a camera from intense heat of a basic oxygen furnace (BOF) (col. 4, lines 37-56) and concludes that it would have been obvious to cover a camera and display with insulated jackets to protect them from heat if used in an environment of extreme heat (EA10). We agree. In our opinion, one skilled in the art adapting the camera and display system of Hanson to a fire fighting environment (one of the different uses taught for Hanson's system at col. 15, line 39) had sufficient knowledge both to recognize the problem that the camera and display would be exposed to high temperatures and flames and the solution of using fire protective insulated jackets.

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Furthermore, providing insulation around an object which will be exposed to extreme heat is considered within the common sense of an ordinary person. See Bozek, 416 F.2d at 1390, 163 USPQ at 549 (a conclusion of obviousness may be made from common knowledge and common sense of the person of ordinary skill in the art without any specific hint or suggestion in a particular reference). The rejection of claim 16 is sustained.

Appellants argue that "Rodway adds nothing to the disclosure of Hanson and Coombs with respect to the mounting of the infrared sensor camera, and hence one of ordinary skill in the art having these three references before him would not find the combined limitations recited in Claim 16, as dependent on Claim 1, to be obvious" (Br3). Thus, appellants essentially argue that claim 16 is patentable because it depends on claim 1. This argument is not persuasive since we conclude that claim 1 is unpatentable.

Appellants further argue that the examiner's rejection of claim 16 is based on impermissible hindsight. We disagree. One skilled in the art seeking to use the camera and display system of Hanson in a fire fighting environment (one of the

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different uses taught for Hanson's system at col. 15, line 39) had sufficient knowledge and common sense both to recognize the problem that the camera and display would be exposed to high temperatures and flames and the solution of using fire protective insulated jackets.

Claim 23 -- Hanson, Hamilton, and Eckstein

Claim 23 recites that the camera is mounted in a position to be cooled by the exhalation gas of an exhalation valve on a facepiece. The examiner applies Hamilton as showing an open loop breathing system connected to a faceplate and Eckstein as teaching the use of the exhaled gas to cool the outer housing of a heated cartridge. Appellants argue that the combination is mere hindsight (Br31-32). We agree with appellants.

Eckstein is a closed loop system that recycles exhaled air over a regenerative cartridge 5. There is no suggestion in Hamilton or Eckstein of using exhaled gas from an open loop system to cool an external component. The examiner has failed to establish a prima facie case of obviousness. The rejection of claim 23 is reversed.

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CONCLUSION

The rejections of claims 1, 3, 8-14, 16-18, and 24 are sustained.

The rejections of claims 4, 5, 7, 19-21, and 23 are reversed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED-IN-PART

JOHN C. MARTIN)	
Administrative	Patent Judge)
)	
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)	
)	
RICHARD TORCZON)	
Administrative Patent Judge)	

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