

No. 94-1084C

(Filed: February 8, 2002)

JAMES E. WRIGHT,

Plaintiff,

v.

Literal Infringement; Doctrine of
Equivalents; Use of “comprising” in
patent claim.

THE UNITED STATES,

Defendant.

Martin H. Freeman and Mark A. Freeman, Rockville, MD, for plaintiff.

Robert G. Hilton, Commercial Litigation Branch, Civil Division, United States Department of Justice, Washington, DC, for defendant, with whom were Vito J. DiPietro, Director; and Stuart E. Schiffer, Acting Assistant Attorney General. Thomas J. Byrnes, of counsel.

OPINION

DAMICH, Judge.

I. Introduction

This is a patent infringement action pursuant to 28 U.S.C. § 1498 in which James E. Wright (hereinafter “Plaintiff”) seeks compensation for the alleged use and manufacture of a detonator net weapon covered by United States Patent 4,768,417 (the ‘417 Patent).¹ Plaintiff alleges that the United

¹ The following abbreviations are used: “Tr.” for trial transcript; “Hr’g” for closing argument hearing; “Stip.” for the parties’ joint stipulations filed on June 20, 2000; “Claim Constr. #1” for the first claim construction opinion issued by Judge Margolis on May 14, 1997; and “Claim Constr. #2” for the

States Navy's (hereinafter "Defendant's") Distributed Explosive Technology (DET) system infringes the '417 Patent. The Court conducted a trial in this matter from August 28, 2000, until August 31, 2000, and held closing arguments on September 18, 2001. For the reasons set forth herein, the Court hereby finds infringement of the detonator net weapon. A decision and opinion on damages will follow.

II. Background

The claims of the '417 Patent (See Diagram 3), which was issued on September 6, 1988, concern a detonator net weapon designed to explode upon ignition, thereby damaging an enemy object. Based on the patent and the use of linear explosive charge technology, Plaintiff developed a proposal for a rocket-deployed explosive net for clearing mines. Plaintiff presented his proposal to various Navy and Marine Corps offices from 1988 until 1991. Because of a longstanding problem with shallow water mine-clearing operations, the Navy issued a Broad Agency Announcement in July 1991, asking for ways to solve the shallow water and surf zone mine-clearing problem. In response, Plaintiff submitted three additional proposals demonstrating the effectiveness of the detonator net weapon in solving the shallow water mine-clearing problem. In March 1992, Defendant notified Plaintiff that it would be developing its DET system in-house and that Plaintiff's proposals would no longer be considered.

Plaintiff then offered Defendant a license to use the '417 Patent in the development of the DET system. Defendant rejected this offer, asserting that Plaintiff's claims were invalid based on prior art not previously disclosed. In response to this challenge to the validity of the '417 Patent, Plaintiff filed a Request for Reexamination of the '417 Patent. On March 10, 1994, the United States Patent and Trademark Office (USPTO) denied Plaintiff's Request for Reexamination, concluding that no new substantial question of patentability had been raised by the prior art references cited by Defendant and confirming the validity of the '417 patent. In April 1994, Plaintiff offered Defendant another license for the use of the invention. After Defendant rejected that offer, Plaintiff commenced the current action on December 21, 1994.

The issue before the Court is whether the DET system falls within the scope of the independent claims of the '417 Patent, infringing the patent either literally or under the doctrine of equivalents. The '417 Patent contains one independent claim, Claim 1. Claim 1 reads:

1. A detonator net weapon comprising:
 - (a) a net comprising spaced, interwoven, alternating lengths of plastic rope and detonator cord that define a polygonal body including an edge,
 - (b) said plastic rope imparting strength to the net,
 - (c) control packages secured to the edge of said net, and
 - (d) said control packages including means to ignite said detonator cord so that said cord will explode with significant force.

second claim construction opinion issued by this Court on May 14, 2001.

'417 Patent, col. 4, ll. 39-48.

The DET system (See Diagram 1 and 2), which was designed to breach mine fields in the surf zone, is a rocket-launched explosive array that includes a single fire-and-forget fuse. Stip. #7-8. The DET system is a 180-foot by 180-foot matrix consisting of three array panels of equal size that are connected to each other by steel chain links. Stip. #10, 13, 33. The system has 180 force members (each containing a detonating cord) that extend longitudinally in the direction of travel. Stip. #14-15. Each of the three array panels of the DET system includes 29 crossmembers extending perpendicularly to the force members as well as varying numbers of reinitiation lines parallel to the crossmembers. Stip. #19-20. Each reinitiation line contains a detonating cord and is located near the outer transverse edges of each panel assembly. Stip. #20. Every crossmember and every reinitiation line is sewn or bar tacked to the force member that it crosses. Stip. #19, 22. In addition to the sewing or bar tacking, at each intersection between reinitiation line and force member, a small clamp holds the intersecting lines together, insuring transfer of the detonation wave from one line containing a detonating cord to another perpendicular line containing a detonating cord. Stip. #27.

The Court finds for the Plaintiff because the DET system literally infringes three of the four elements of Claim 1 of the '417 Patent and infringes the fourth element of the '417 Patent under the doctrine of equivalents.

III. Literal Infringement

A. Law

Determining whether a patent claim is infringed requires a two-step inquiry. The first step is that the claim must be properly construed to determine its scope and meaning. *Markman v. Westview Instruments, Inc.*, 517 U.S. 370, 384 (1996).² The second step of the infringement inquiry is that the properly construed claim must be compared to the accused device. *Intermatic Inc. v. Lamson & Sessions Co.*, 273 F.3d 1355, 1363 (Fed. Cir. 2001). In comparing the properly construed claim to the accused device, the patentee bears the burden of proving by a preponderance of the evidence that every feature that is an actual limitation must be found in the accused device. *Biovail Corp. Int'l v. Andrx Pharm., Inc.*, 239 F.3d 1297, 1303 (Fed. Cir. 2001).

B. Analysis

1. A Net Comprising Spaced, Interwoven, Alternating Lengths of Plastic Rope & Detonator Cord that Define a Polygonal Body Including an Edge

² In this case, two claim constructions have been completed. The first was decided by Judge Margolis on May 14, 1997. The second claim construction was completed by this Court on May 14, 2001.

The first issue before the Court is whether the DET system literally infringes Claim 1(a) of the '417 Patent, calling for a net comprising spaced, interwoven, alternating lengths of plastic rope and detonator cord that define a polygonal body including an edge. Analysis of this issue begins with recognition of the mutually agreed-upon premise that the accused device is indeed a net. As a net, the device consists of components woven together at regular intervals, forming a meshed network of lines.³ *Webster's Ninth New Collegiate Dictionary* 794 (1990). According to Plaintiff's undisputed assertions, each of these components contains plastic rope or both plastic rope and detonator cord.⁴ The Court must determine whether the net comprises plastic rope and detonator cord that are spaced, interwoven, and of alternating lengths, defining a polygonal body including an edge. The Federal Circuit has defined comprising as "to signify that the claims do not exclude the presence in the accused apparatus . . . of factors in addition to those explicitly recited." *Vivid Techs., Inc. v. American Science & Eng'g, Inc.*, 200 F.3d 795, 811 (Fed. Cir. 1999); *see also Smith & Nephew, Inc. v. Ethicon, Inc.*, 61 U.S.P.Q.2d 1065, 2001 WL 1590040, at *6 (Fed. Cir. Dec. 12, 2001). Based on this definition, as long as the DET system contains the limitations stated in the claim, infringement exists regardless of the presence of additional elements that are not literally called for in the claim. Thus, the DET system comprising spaced, interwoven, alternating lengths of plastic rope and detonator cord that define a polygonal body including an edge is a system that must contain such features, not a structure precluded, in addition, from containing plastic rope and detonator cord that are not spaced, interwoven or of alternating lengths.

a. Spaced

According to the first claim construction by Judge Lawrence S. Margolis, the term "spaced" means "to place at intervals." Claim Constr. #1, at 6, n.2 (citing *Webster's Third New International Dictionary (Unabridged)* 2180 (1976)). Based on this definition and the testimony of Mr. Bobby Craig, Defendant's expert witness, the Court finds that the accused device does comprise spaced plastic rope and detonator cord that define a polygonal body including an edge.

Plaintiff spends a good deal of time in its briefs arguing that in all possible permutations of plastic rope and detonator cord, the plastic rope is spaced from the detonator cord.⁵ Pl.'s Post Trial Br. at 7.

³ The principal components of the accused device are the longitudinal force members, horizontal reinitiation lines, and crossmembers.

⁴ All longitudinal and lateral exoskeleton sleeves, braided cords, and crossmembers made out of Kevlar are plastic. Tr. 165:23-166:25. Further, these plastic cords meet Plaintiff's definition of "rope." Tr. 167:8-168:10 (defining a rope as "a large stout cord of strands of fibers or wire twisted or braided together").

⁵ For example, Plaintiff asserts that all longitudinal detonator cords are spaced from all other longitudinal detonator cords, longitudinal exoskeletons, braided cords, lateral detonator cords, lateral exoskeletons, and crossmembers.

Despite these efforts, the Court need only focus on whether the accused device *comprises* spaced plastic rope and detonator cord, rather than whether each plastic rope is spaced from each detonator cord. Moreover, the Court is only concerned with spacing between plastic rope and detonator cord *defining a polygonal body including an edge*.⁶ Thus, the Court is concerned with whether the plastic rope of one longitudinal force member is spaced from the detonator cord of the next parallel longitudinal force member⁷ and whether the plastic rope of each horizontal component, albeit a reinitiation line or a crossmember, is spaced from the detonator cord of the next parallel horizontal component, namely the next reinitiation line.⁸ In focusing strictly on one component's plastic rope and the next parallel component's detonator cord, spacing is evident throughout the entire accused device.

Because the Court finds that there is spacing between the plastic rope of one vertical component and the detonator cord of the next vertical component as well as spacing between the plastic rope of one horizontal component and the detonator cord of the next horizontal component, the Court envisions the net structure as merely a melding of two distinct perpendicular entities to form the grid-like structure. Thus, the Court need not find spacing between the plastic rope of one component and the detonator cord of any other perpendicular component. Spacing already exists in the vertical components' plastic ropes and detonator cords as well as in the horizontal components' plastic ropes and detonator cords. Thus, the accused device comprises spaced plastic rope and detonator cord.

b. Interwoven

According to the first claim construction, the term “interwoven” means “woven together in texture or construction.” Claim Constr. #1, at 6, n.2 (citing *Webster’s Third New International Dictionary (Unabridged)* 1184 (1976)). The term “weave” means “to form . . . by interlacing strands.” *Id.* (citing *Webster’s Third New International Dictionary (Unabridged)* 2591 (1976)). Additionally, “[p]arallel lengths of rope and detonator cord are insufficient to meet the claim’s limitation. Rather, there must be some connection, or crossing of planes, between the plastic rope and the

⁶ Because a polygon is defined as “a closed plane figure bounded by straight lines,” *Webster’s Ninth New Collegiate Dictionary* 912 (1990), the Court is solely concerned with the interrelation between plastic rope of one line segment and detonator cord of a separate and distinct line segment. Thus, the Court will not consider the composition of a line segment by itself for purposes of determining whether plastic rope and detonator cord of the accused device are spaced, interwoven, or of alternating lengths.

⁷ Although Defendant did not address this idea in its briefs, spacing among these elements is essential to defining the net structure.

⁸ The Court is unconcerned with the sequence of reinitiation lines and crossmembers. Regardless of whether two crossmembers occur in a row, the plastic rope of each one is spaced from the detonator cord of the next-occurring reinitiation line. Therefore, plastic rope and detonator cord of distinct components are still spaced throughout the accused device.

detonator cord.” *Id.* Thus, for the plastic rope and detonator cord to be interwoven, they must be interlaced in texture or construction and must be connected or must cross planes. Based on this definition, the accused device at issue is interwoven.

In reaching this conclusion, the Court reiterates its focus on determining whether the DET system *comprises* interwoven plastic rope of one component and detonator cord of any other component. Focusing strictly on the definition of “comprise,” the Court need only find interlacing and interconnection between one reinitiation line’s plastic rope and one longitudinal force member’s detonator cord, or alternatively between one longitudinal force member’s plastic rope and one reinitiation line’s detonator cord; although, of course, for purposes of defining a net, there must be multiple interwoven components that comprise a meshed network of lines. Multiple interwoven components that comprise a meshed network of lines are found, since interweaving occurs throughout the DET system at points in which initiation clamps hold together longitudinal force members and reinitiation lines, making possible the transfer of detonation from one component to the other.⁹ Beneath each initiation clamp, the stitched white fabric of the longitudinal force member loops around the reinitiation line, compressing it into the longitudinal force member. This causes the detonator cord of one force member to be interlaced with the plastic rope and, by extension, the detonator cord, of the other force member. This interlaced construction of connected plastic rope and detonator cord is sufficient to cause the DET system to be interwoven.¹⁰

c. Alternating

According to the first claim construction, the term “alternating” means “occurring or succeeding by turns.” *Id.* (citing *Webster’s Third New International Dictionary (Unabridged)* 63 (1976)). Based on this definition and the testimony of Mr. Martin Hoffman, Plaintiff’s expert witness, the Court finds that the DET system does comprise alternating lengths of plastic rope and detonator cord.

The accused device is composed of parallel plastic ropes and detonator cords that run horizontally and vertically to create a closed figure bounded by at least three line segments. This structure is a result of two alternations: (1) the detonator cords within the reinitiation lines that run horizontally alternate with the parallel crossmembers; and (2) the detonator cords within every other longitudinal force member that run vertically alternate with the parallel plastic rope of those longitudinal

⁹ Despite Defendant’s accurate assertion that parallel components are not interwoven, each length of plastic rope need not be interwoven with each length of detonator cord in order for the accused device to comprise interwoven plastic rope and detonator cord.

¹⁰ As long as there is a connection between plastic rope and detonator cord, no crossing of planes is required in accordance with the claim construction. Moreover, plastic rope and detonator cord of the accused device cannot cross planes because a plane is defined as “a surface of such nature that a straight line joining two of its points lies wholly in the surface.” *Webster’s Ninth New Collegiate Dictionary* 899 (1984). Thus, the intersection of any two lines creates merely one plane, rather than a crossing of multiple planes, as argued by Defendant. Def.’s Post Trial Reply Br. at 4.

force members in between, creating an alternation of one longitudinal force member's detonator cord to the next longitudinal force member's plastic rope.¹¹

First, the detonator cords contained within the reinitiation lines alternate with the plastic ropes of the crossmembers. According to Mr. Hoffman, with whom the Court agrees, alternating requires only the existence of some plastic rope followed by some detonator cord followed by some plastic rope, etc., regardless of what may come between. There is no necessity for any repetitive pattern, such as a one-to-one correspondence or recurring mathematical relationship between reinitiation lines and crossmembers for the two to alternate, as the Defendant contends. Judge Margolis's interpretation of "alternating" does not require such a limitation. Tr. 279:10-20. Because there are a series of horizontal reinitiation lines throughout the DET system and because there are also a series of horizontal crossmembers throughout the DET system and because the two occur by turns, succeeding one another throughout the DET system, they do alternate.

Second, the detonator cords within every other longitudinal force member alternate from the plastic rope of each of the longitudinal force members in between.¹² Based on Plaintiff's argument, with which the Court agrees, every other detonator cord, when looked at independently (i.e., without taking into consideration the other components of the longitudinal force member), alternates from every plastic rope. Similarly, every other plastic rope alternates from every other detonator cord. Together, the two simultaneous alternations cause the entire DET system to alternate. The mere presence of additional elements is irrelevant if all the claimed elements are present in the accused structure. *Mannesmann Demag Corp. v. Engineered Prod. Co., Inc.*, 793 F.2d 1279, 1282-83 (Fed Cir. 1986). Thus, the presence of detonator cord between every other detonator cord does not cause the DET system not to alternate. Rather, it produces another alternation of detonator cord to plastic rope.

Because the Court finds that the accused device comprises spaced, interwoven, alternating lengths of plastic rope and detonator cord that define a polygonal body including an edge, the device literally infringes Claim 1(a) of the '417 Patent.

2. Said Plastic Rope Imparting Strength to the Net

Defendant does not dispute that the plastic rope of the exoskeleton sleeves, crossmembers, and braided cords imparts strength to the DET system. Accordingly, the DET system literally infringes Claim 1(b) of the '417 Patent.

3. Control Packages Secured to the Edge of the Net

¹¹ There is no need for the perpendicular components to alternate from one another in order for the accused device to comprise alternating lengths of plastic rope and detonator cord.

¹² Again, the Court is not concerned with whether the plastic rope and detonator cord of the same force member are alternating (occurring or succeeding by turns). Rather, the Court focuses on whether the plastic rope of one component alternates from the detonator cord of any *other* component.

The parties' dispute regarding Claim 1(c) of the '417 Patent centers on whether there is more than one control package. Plaintiff and Defendant already agree that the fuse, which is secured to the center of the aft edge of the aft panel of the net and causes the detonator cord to explode, is a control package because it qualifies as a package secured to the aft end of the aft panel that controls ignition. The accused device also contains initiation clamps at the left and right edges of the accused device that insure the transfer of the detonation wave from the reinitiation line's detonator cord to the longitudinal force member's detonator cord. If the Court determines that these clamps secured to the edge of the accused device also qualify as control packages, there will be multiple control packages in the accused device secured to the edge of the net so that Claim 1(c) will be literally infringed.¹³

The initiation clamps are control packages connecting the reinitiation lines to the left and right edge longitudinal force members and controlling the distribution of the ignition from the reinitiation line's detonator cord to the longitudinal force member's detonator cord. The small clamps that exist at the intersections of the outermost reinitiation lines and outermost longitudinal force members are "packages." The parties have agreed that the definition of a "package" is "groups of things; a parcel; a bundle." July 26, 2001 Status Conf. at 11 (referenced in Def.'s Post-Trial Reply Br., Attach. 2). A bundle is "a number of things fastened or tied together." *Id.* Because the two plastic pieces fastened together that comprise the initiation clamp meet the definition of a bundle, the clamp itself can be defined as a package.

The more difficult issue for the Court is whether the clamps that the Court defines as packages control detonation as opposed to merely facilitating the transfer of detonation. As the parties agreed to in closing arguments, "control" is defined as "a device for regulating, guiding, or directing the operation of a machine, apparatus, or vehicle." *Random House Webster's College Dictionary* 290 (1999). The Court finds that the clamps do control the transfer of detonation because they direct the operation of the apparatus, guiding the detonation from one force member to another perpendicular force member.¹⁴ Moreover, the broad definition of "control" is to "exercise restraint or direction over." *Id.* The transfer of detonation is insured by the direction exercised by the clamps. In addition, the parties agree that the absence of the clamps would preclude the transfer of detonation. Stip. #30 ("Without the clamp, the detonation wave would not transfer."). Despite Defendant's argument that the clamps simply allow the detonation to move along on its path, rather than stopping or breaking the course of the shockwave, Hr'g 65, the Court finds that because the presence of the clamps causes detonation to change from a vertical propulsion to a horizontal propulsion, the clamps are exerting a control over the detonation, routing the shockwave to perpendicular force members to cause the net to fully explode. Without the clamps, the reinitiation lines would still interweave with the longitudinal force members, yet

¹³ While Plaintiff spends a great deal of time arguing that other aspects of the accused device qualify as control packages, the Court does not need to consider such arguments if it finds that the clamps secured to the edge of the accused device qualify as control packages.

¹⁴ According to the parties' joint stipulation, the clamps insure the transfer of the detonation wave from one horizontal detonator cord to another vertical detonator cord. Stip. #27, 29.

detonation would move uncontrollably through the accused device, bypassing perpendicular force members and preventing full detonation of the net.

Because the Court finds that the outermost initiation clamps of the accused device are packages that control the transfer of detonation, Claim 1(c) of the '417 Patent, calling for multiple control packages secured to the edge of the net, is literally infringed. Therefore, it is unnecessary for the Court to evaluate the parties' arguments regarding whether other aspects of the accused device qualify as control packages.

4. Said Control Packages Including Means to Ignite Said Detonator Cord so that Said Cord Will Explode with Significant Force

To literally infringe Claim 1(d) of the '417 Patent, both the fuse and the initiation clamps secured to the edge of the net must include means to ignite the detonator cord to cause it to explode with significant force. According to Defendant, there is no ignition whatsoever occurring in the accused device. Rather, the detonation, which is an exothermic reaction, occurs from a shock compression wave that travels at supersonic speed. Thus, the heat from the exothermic reaction travels at a slower pace so that there is no remaining unreacted detonator cord to be ignited after the detonation. Plaintiff takes the contrary position that both the fuse and the initiation clamps cause ignition of the detonator cord, causing the detonator cord to explode. Specifically, Plaintiff asserts that the timer in the fuse that sets off a stab actuator causes a small explosion that sets off a small booster charge outside the fuse and ignites the detonator cord. In addition to the fuse, the initiation clamps are control packages that transfer detonation from the reinitiation lines to the longitudinal force members, giving off heat as the detonator cord is ignited and caused to explode with significant force.

After careful consideration of the arguments, the Court is persuaded that there is a distinction between ignition and detonation so as to warrant finding no literal infringement as to Claim 1(d) of the '417 Patent. "Ignite" means "to cause to burn" or "to subject to . . . intense heat." *Webster's Ninth New Collegiate Dictionary* 598 (1990). "Detonate" means "to explode with sudden violence." *Webster's Ninth New Collegiate Dictionary* 346 (1990). According to Mr. Craig, Defendant's detonation expert, the detonator cord is exploded with significant force due to detonation, not ignition. The detonation occurs from shockwaves that pass from the control packages, such as the fuse and initiation clamps, through the detonator cord at supersonic speed. These shockwaves from the detonation are not a transfer of heat. Thus, any heat produced from the detonation, which is in fact an exothermic reaction, comes on the heels of the detonation. Based on this interpretation, which the Court finds credible, the detonator cord may be ignited by heat from the detonation, and may be made to burn, yet such ignition and burning succeeds the detonation that is the cause of the detonator cord's explosion with significant force.

Because the DET system does not contain control packages with means to ignite the detonator cord to cause it to explode with significant force, it does not literally infringe Claim 1(d) of the '417 Patent. Thus, while the accused device literally infringes the first three of the four elements of the claim, the absence of literal infringement of the fourth element precludes the Court from finding that the '417 Patent is literally infringed by the accused device.

IV. Doctrine of Equivalents

A. Law

As part of the second step in the two-step inquiry of determining infringement, a properly construed claim being compared to the accused device that does not literally infringe can nonetheless infringe under the doctrine of equivalents. *Bose Corp. v. JBL, Inc.*, 274 F.3d 1354, 1358 (Fed. Cir. 2001). To prove infringement under the doctrine of equivalents, the Court must find that a substituted feature of the claim performs the same function in the same way to achieve the same result as the limitation of the claim. *Toro Co. v. White Consol. Indus., Inc.*, 266 F.3d 1367, 1370 (Fed. Cir. 2001). The function-way-result test must be performed for each claim limitation that is not literally present in the accused device. *Warner-Jenkinson Co. v. Hilton Davis Chemical Co.*, 520 U.S. 17, 39-40 (1997). With regard to the DET system, there is literal infringement of Claims 1(a), 1(b), and 1(c). Claim 1(d) is at issue regarding analysis under the doctrine of equivalents.

B. Analysis

1. Said Control Packages Including Means to Ignite Said Detonator Cord so that Said Cord Will Explode with Significant Force

While there is no literal infringement of Claim 1(d) of the '417 Patent because the identified control packages do not ignite the detonator cord to cause it to explode with significant force, the accused device still infringes Claim 1(d) under the doctrine of equivalents. Both of the aforementioned control packages, the fuse and the initiation clamps, act as control packages that have means to cause the detonator cord to explode with significant force. The relevant inquiry is whether the method used by the accused device “performs substantially the same function, in substantially the same way, to achieve substantially the same result.” *Alpex Computer Corp. v. Nintendo Co.*, 102 F.3d 1214, 1222 (Fed. Cir. 1996).

- a. Fuse Assembly

According to the parties, the DET system contains a fuse secured to the center of the aft edge of the aft panel of the net. Stip. #37-39. The fuse has a timer that causes an actuator to be stabbed and an impact-sensitive explosive to be activated. Tr. 858:11-18; 223:21-225:6. This activation, which causes a shockwave that gives off heat to detonate the detonator cord and cause it to explode with significant force, is substantially the same as ignition, which would activate a burning or intense heating of the detonator cord to cause it to explode with significant force. While the ignition occurring in the accused device that causes the detonator cord to explode with significant force varies from the shockwave causing detonation of the detonator cord, both processes involve releasing of intense heat. While the heat from the detonation moves at a slower pace than the supersonic speed of the

shockwave, it does rapidly follow the shockwave so that the detonator cord is reacted in a substantially similar way as it would be from ignition. Most importantly, the accused device's shockwave performs *exactly* the same result as ignition of the detonator cord, in that it causes the detonator cord to explode with significant force. Stip. #17.

Because the fuse assembly in the DET system is a control package performing substantially the same function in a similar way to bring about the exact same result as called for in Claim 1(d) of the '417 Patent, the claim is infringed pursuant to the doctrine of equivalents.

b. Initiation Clamps

Because the Court has deemed the initiation clamps to be control packages secured to the edge of the net, the clamps are a necessary means of causing the explosion with significant force of one detonator cord to pass to a perpendicular, interwoven detonator cord held down by the clamp. Thus, as with the fuse assembly, the initiation clamps route the detonation from one detonator cord to another, giving off heat in the process as would ignition of the detonator cord. Again, a shockwave precedes the heat, or burning, although heat is given off and as a result of the initiation clamps, the reaction occurs and the detonator cord is exploded with significant force. Because the initiation clamps are control packages that perform substantially the same function by substantially similar means, detonation as opposed to ignition, to bring about exactly the same result, the initiation clamps of the accused device infringe Claim 1(d) of the '417 Patent under the doctrine of equivalents. Because the clamps and the fuse assembly are multiple control packages that infringe Claim 1(d) under the doctrine of equivalents, all of the elements of Claim 1 of the '417 Patent are infringed by the DET system.

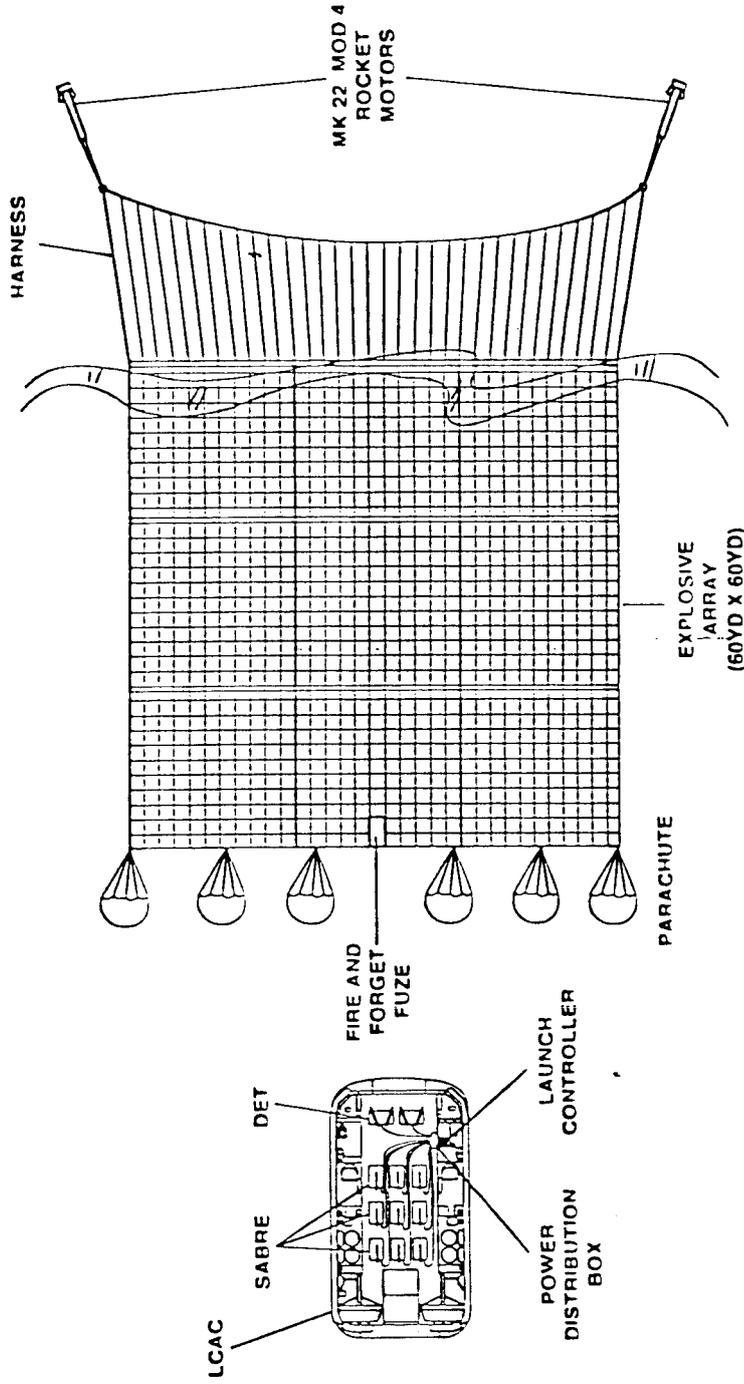
V. Conclusion

Under the second step of the two-step infringement inquiry, the properly construed claim is infringed by the accused device. The DET system literally infringes Claim 1(a), 1(b), and 1(c) of the '417 Patent, and infringes Claim 1(d) under the doctrine of equivalents. A decision and opinion on damages will follow.

EDWARD J. DAMICH
Judge

SHALLOW WATER MCM DISTRIBUTED EXPLOSIVE TECHNOLOGY PROGRAM DESCRIPTION

DIAGRAM 1



SYSTEM DESCRIPTION:

- 180 X 180 FOOT DISTRIBUTED EXPLOSIVE NET DELIVERED BY 2 MK 22 MOD 4 ROCKET MOTORS
- DEPLOYED FROM MANNED LCAC, 200 FT STAND OFF
- MANUAL LAUNCH CONTROL
- PARACHUTES FOR EXPANSION
- INTEGRATED DET/SABRE EMPLOYMENT MAXIMIZES EFFECTIVENESS & MINIMIZES LIFT
- FIRE AND FORGET FUZE

DIAGRAM 2

DET SYSTEM

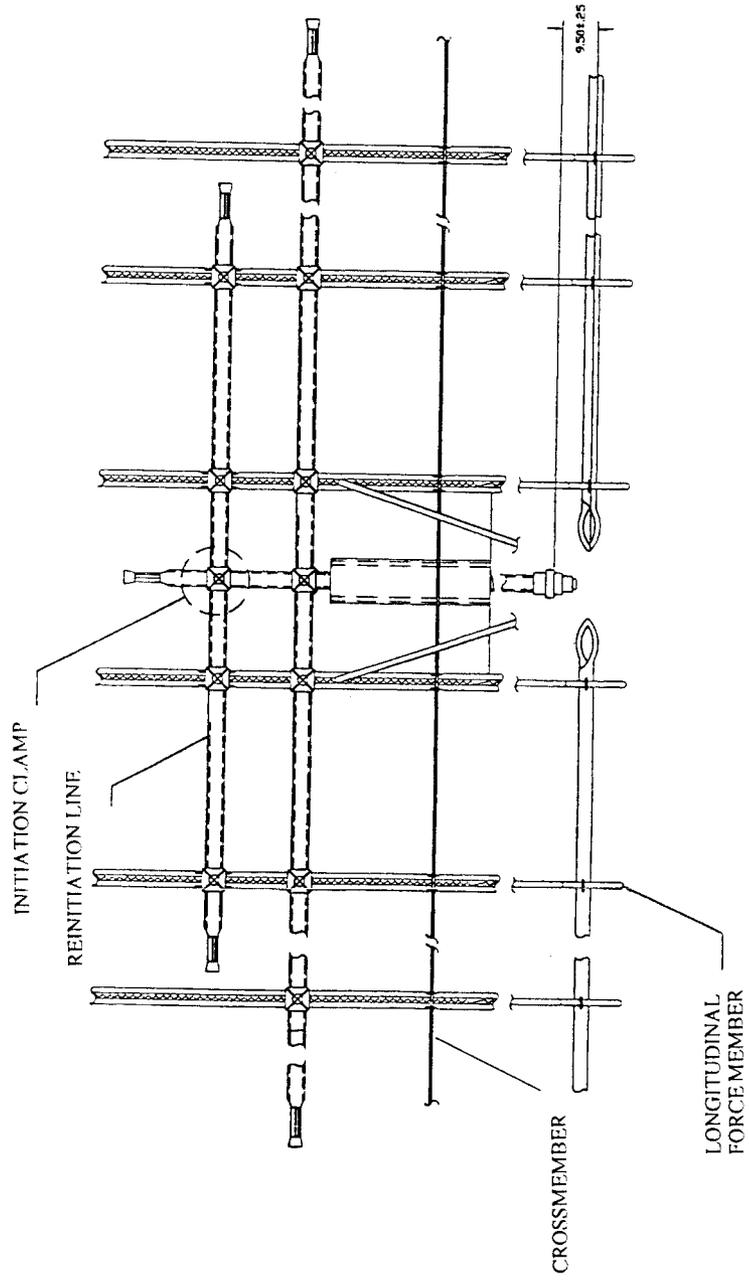


DIAGRAM 3

FIG. 1.

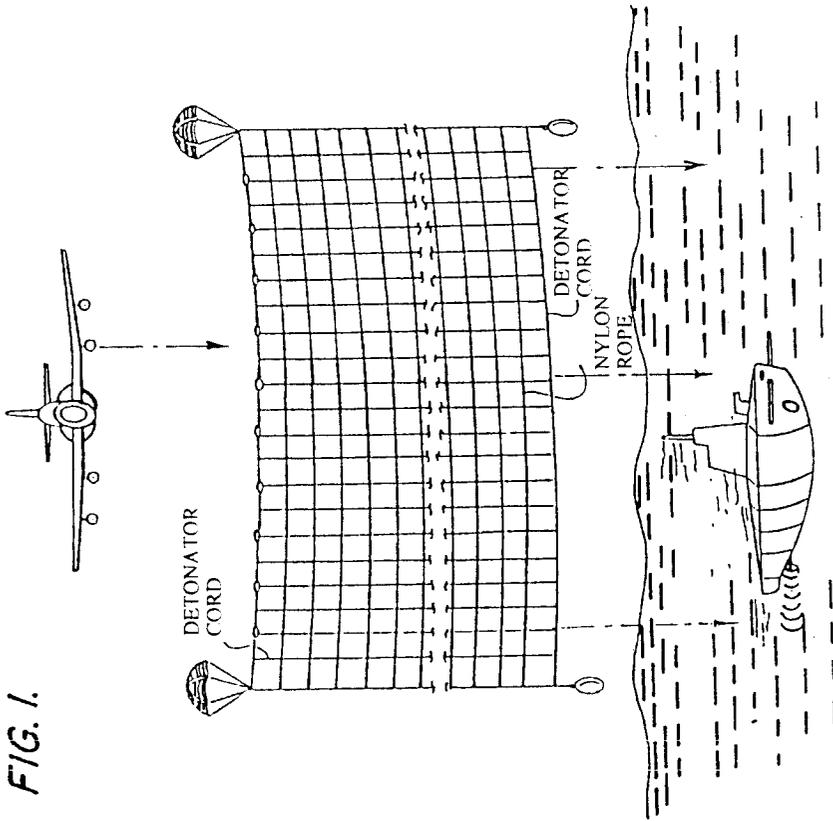


FIG. 2.

