United States District Court,
S.D. Indiana, Indianapolis Division.

Philip S. JACKSON,
Plaintiff.
v.
THOMSON CONSUMER ELECTRONICS, INC,
Defendant.

No. IP 98-1712-C-Y/G

Jan. 16, 2001.

Owner of patent for tone-operated remote control device brought infringement action against competitor. Construing disputed claims, the District Court, Young, J., held that: (1) microprocessor programmed to perform functions called for in means-plus-function claims was equivalent to digital logic integrated circuitry disclosed in specification; (2) function of "detecting means" was to receive tone signals from phone line, detect at least one predetermined sequence, and to produce corresponding sequence detection signal; (3) function of "control means" was to respond to sequence detection signal by producing control signal; (4) function of "switching means" was to respond to control signal by activating given instrument under control; and (5) function of "decoupling means" was to respond to remotely located transmitter going off telephone line by disconnecting control apparatus from telephone line.

Claims construed.

4,596,900. Cited.

Raiford A. Blackstone, Jr., Timothy M. McCarthy, Trexler, Bushnell, Giangiorgi, Blackstone & Marr, Ltd., Chicago, Illinois, and David T. Kasper, Locke Reynolds LLP, Indianapolis, IN, for Plaintiff.

Harold J. McElhinny, Morrison & Foerster, LLP, San Francisco, CA, John P. Corrado, Morrison & Foerster, LLP, Washington, D.C., John F. Prescott, Jr., Jay G. Taylor, Ice Miller Donadio & Ryan, Indianapolis, IN, and Jeffrey D. Carter, Thomson Consumer Electronics, Inc., Indianapolis, IN, for Defendant.

ORDER CONSTRUING CLAIMS OF U.S. PATENT NO. 4,596,900

YOUNG**, District Judge.**

This is a patent case. Plaintiff Philip S. Jackson ("Jackson"), is the owner of U.S. Patent No. 4,596,900 ("the '900 patent"). The '900 patent discloses and claims a set of electronic circuits for remotely controlling appliances or devices through the use of tones produced by touch-tone telephones. This invention can be connected to, for example, a heating or air conditioning system or a lighting system, and enables a caller to remotely control the attached appliance. For purposes of this action against Thomson Consumer Electronics ("Thomson"), Jackson's invention also relates to a feature common to telephone answering machines, referred to in the telephone answering device industry as "beeperless" remote control or "tone" remote control. In his Complaint, Jackson directly accuses nine Thomson products of infringing his '900 Patent,

namely, Thomson's "GE" Models 2-9975, 2-9991, 2-9866, 2-9827, 2-9831, 2-9824, 2-9802, 2-9790, and 2-9740. (Complaint, para. 47). Jackson also suggests the existence of other allegedly infringing Thomson devices by making reference to "... other Thomson devices constructed in a similarly infringing fashion ..." Id.

On June 8-9, 2000, the court held a hearing in accordance with Markman v. Westview Instruments, Inc., 517 U.S. 370, 116 S.Ct. 1384, 134 L.Ed.2d 577 (1996) to construe disputed claims of the '900 patent. This is the court's construction of those disputed claims.

I. Factual and Procedural History

The court draws the following facts from the Complaint, the briefs submitted by the parties in connection with the *Markman* hearing, and the testimony and evidence presented during the hearing.

On June 24, 1986, the Patent and Trademark Office issued the '900 patent. The '900 patent relates to a novel apparatus that responds to a predetermined sequence of tones, such as the touch-tones generated by most telephones, to enable the user to control-from a remote location-a large number of functions associated with the apparatus, and to do so in a simple, inexpensive, highly reliable, flexible, and convenient manner. Jackson did not invent touch-tone remote control per se, but his invention improved touch-tone remote control so much that it made it practical for use in consumer electronics products such as telephone answering machines. This feature often is referred to in the telephone answering machine industry as "beeperless" remote control or "tone" remote control. It enables a user to call his or her telephone answering machine at a remote location and, by then pressing the "3" and "1" buttons (for example) on the telephone, cause the machine to play back any messages recorded on the machine. Pressing other buttons enables remote control of other features.

Jackson's patent describes the structure for utilizing his invention in terms of digital logic integrated circuitry (*e.g.,* AND gates, NAND gates, OR gates, counters, etc.). Today's telephone answering machines sold by Thomson (and the rest of the industry) employ digital logic integrated circuitry by using "microprocessors" or "microchips" which have the same components (*e.g.,* AND gates, NAND gates, OR gates, counters, etc.).

In 1994, Matsushita Electric Co. and Kazuo Hashimoto (Matsushita's licensor for patents relating to telephone answering machines) attacked Jackson's patent three times by way of reexaminations in the United States Patent and Trademark Office ("PTO"). At issue here are those claims set forth in the second Reexamination Certificate issued by the PTO on August 26, 1997, Reexamination Certificate No. B2 4,596,900. After briefing this issue, the parties have pared down the claims in dispute to Claims 1, 5 and 10.

II. Claim Construction

[1] [2] [3] Construction of patent claims is a matter of law for the court. Markman v. Westview Instruments, Inc., 52 F.3d 967, 979 (Fed.Cir.1995) (*en banc), aff'd,* 517 U.S. 370, 116 S.Ct. 1384, 134 L.Ed.2d 577 (1996). Claims are construed from the vantage point of a person of ordinary skill in the art at the time of the invention. Id. at 986. In construing a claim, the court first looks to the intrinsic evidence of record, namely, the language of the claim, the specification, and the prosecution history. *E.g.,* Vitronics Corp. v. Conceptronic, Inc., 90 F.3d 1576, 1582 (Fed.Cir.1996). In most circumstances, the intrinsic evidence will provide sufficient information for construing the terms. Id. at 1583.

A. Intrinsic Evidence

[4] The court must begin with the claim language, which defines the scope of the claims. *See* York Products, Inc. v. Central Tractor Farm & Family, 99 F.3d 1568, 1572 (Fed.Cir.1996). In analyzing claim language, the

court must give the words of the claim their ordinary and customary meaning. Vitronics, 90 F.3d at 1582.

In order to give context to the claim language, the court must also review the specification:

The specification acts as a dictionary when it expressly defines terms used in the claims or when it defines terms by implication ... As we have repeatedly stated, "[c]laims must be read in view of the specification, of which they are a part." ... The specification contains a written description of the invention which must be clear and complete enough to enable those of ordinary skill in the art to make and use it. Thus, the specification is always relevant to the claim construction analysis. Usually, it is dispositive; it's the single best guide to the meaning of a disputed term.

Id. at 1582.

The last source of intrinsic evidence relevant to claim interpretation is the prosecution history of the patent, if it has been made part of the record.

This history contains the complete record of all proceedings before the Patent and Trademark Office, including any express representations made by the applicant regarding the scope of the claims. As such, the record before the Patent and Trademark Office is often of critical importance in determining the meaning of claims.

Id.

[5] [6] Moreover, the court may examine technical treatises and dictionaries "at any time" in order to better understand the underlying technology and can rely on this evidence to construe the claims so long as it does not contradict the patent documents. *Id*. at 1584, n. 6. Additionally, the court may admit and rely on prior art, whether or not it is cited in the specification or the file history, as prior art can help demonstrate how a term is used by those skilled in the art. *Id*. at 1584.

B. Extrinsic Evidence

[7] If, after reviewing all available intrinsic evidence, some genuine ambiguity still exists in the claims, the court may look to extrinsic evidence as an aid in construing the claim language. *Id*. at 1584. The Federal Circuit has made clear, however, that when the "public record unambiguously describes the scope of the patented invention, reliance on any extrinsic evidence is improper." *Id*. "Extrinsic evidence is any evidence outside of the patent and prosecution history." Markman, 52 F.3d at 980. It may be used to assist the court's understanding of the patent, or the field of technology, but not to vary or contradict the terms of the claims. Id. at 980-81.

C. Construing Means-Plus-Function Claims

[8] The claims at issue here are means-plus-function claims. A "means-plus-function" claim recited in general terms is a "means" for performing a precisely stated function without identifying the particular structure, material, or acts of the claimed invention. The statute provides:

An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.

35 U.S.C. s. 112, para. 6. Thus, the scope of a means-plus-function claim is strictly limited to the

"corresponding structure, material or acts" described in the specification, and equivalents of that structure. *Id.; see also* WMS Gaming, Inc. v. International Game Technology, 184 F.3d 1339, 1347 (Fed.Cir.1999). In other words, although an applicant can choose "means-plus-function" claim language rather than specifically describing the structure of his invention, the scope of the "means" for performing the stated function must be limited to the structure he specifically disclosed in the specification, and equivalents thereof.

1. Literal Infringement of a Means-Plus-Function Claim

[9] Jackson alleges literal infringement in this matter. In addressing literal infringement of a means-plus-function claim, the court must as a matter of law (1) identify the claimed function; and (2) locatein the patent specification the structure or equivalent structures which perform the claimed function. *E.g.,* Carroll Touch, Inc. v. Electro Mechanical Systems, Inc., 15 F.3d 1573, 1576 (Fed.Cir.1993). Whether the accused device actually performs those functions and whether the accused device actually uses that structure is not an issue for purposes of claim construction.

[10] The test of Section 112, Paragraph 6 equivalence is "whether the differences between the structure in the accused device and any disclosed in the specification are insubstantial." Valmont Industries, Inc. v. Reinke Manufacturing Co., 983 F.2d 1039, 1043 (Fed.Cir.1993). An insubstantial change is one that "adds nothing of significance to the structure, material, or acts disclosed in the patent specification." *Id.*

2. Infringement of a Means-Plus-Function Claim Under the Doctrine of Equivalents

[11] An accused device may infringe a patent if "there is 'equivalence' between the elements of the accused product or process and the claimed elements of the patented invention." Warner-Jenkinson Co. v. Hilton Davis Chemical Co., 520 U.S. 17, 21, 117 S.Ct. 1040, 137 L.Ed.2d 146 (1997). The doctrine of equivalents is applied to each individual element of a claim, not the invention as a whole. Id. at 29, 117 S.Ct. 1040. Unlike the infringement analysis under Section 112, Paragraph 6, however, infringement under the doctrine of equivalents requires only that the accused device have an equivalent function to the patent claims. *Id.* Thus, the court's determination of the function of the elements of the patent at issue impacts on infringement under the doctrine of equivalents. Whether the accused device performs each of those functions is a fact question not at issue in claim construction.

III. Equivalents Issue

The parties dispute whether this court should make a determination of whether a microprocessor form of digital logic integrated circuitry, programmed to perform the functions of the claims of the '900 patent, is the equivalent, under 35 U.S.C. s. 112, para. 6. The Federal Circuit has spoken on this issue:

[A] court must construe the functional claim language "to cover the corresponding structure, material, or acts described in the specification and equivalents thereof." 35 U.S.C. s. 112.

Valmont Industries, 983 F.2d at 1042. Based upon the statutory language and the case law, the court finds it must construe the means-plus-function claims to cover the equivalents. Accordingly, the court must determine what equivalents are covered by the claims.

At the *Markman* hearing, Jackson presented the language of the patent claims. *See* Plaintiff's Exhibits 5, 6, and 7. The language of the claims sets forth various "means", such as "detecting means", "control means", and "dual state means." Because this is a means-plus-function patent, the court must look to the specification for the disclosed structure and its equivalents.

In the specification of the '900 patent, Jackson disclosed digital logic integrated circuitry, such as AND

gates, OR gates, and flip flops. Jackson did not limit himself to this particular set of circuit components. The specification states that "the scope of the invention should not be limited by the particular embodiments and specific construction described herein but should be defined by the appended claims and equivalents thereof." U.S. Patent No. 4,596,900, col. 11, ll. 43-47. Thus, the language of the '900 patent reserves the right to claim equivalent structure and did not disclaim microprocessors as equivalents.

Further, Jackson introduced the entire file history as its Exhibits A-AA. One of the prior art references in the '900 patent is the Daley, United States Patent No. 4,491,690. The Daley patent related to a control system which utilized telephones as the communication link. The preferred embodiment of the patent utilized a microprocessor. The Daley patent notes, however, the equivalence of hardware and a microprocessor:

The microprocessor design, although preferred, is not essential and it should be understood that equivalent hardware may be employed to perform the same function.

(*See* Plaintiff's Opening Markman Brief, Exhibit E at col. 3, ll. 2-5). Thus, Daley establishes that a microprocessor and discrete digital logic are routine substitutions for each other.

In addition, at the hearing, Jackson introduced the testimony of Dr. Silva, Professor of Electrical Engineering at Purdue University. He testified that, to a person skilled in the art, use of a microprocessor would be a routine substitution for the digital logic integrated circuitry disclosed in the '900 patent. (See generally Transcript of Markman Hearing at 29-40).

And lastly, Jackson introduced a portion of Michael Slater's learned treatise, Microprocessor-Based Design: A Comprehensive Guide to Effective Hardware Design (Prentice Hall 1989) (Plaintiff's Exhibit 4). This treatise demonstrates the fundamental tenet of Jackson's proposed claim construction finding on equivalence. According to Mr. Slater:

The basic digital logic structure is the gate. All digital logic systems, including microprocessors, are composed of gates.

Slater, Microprocessor-Based Design: A Comprehensive Guide to Effective Hardware Design (Prentice Hall 1989) at 3 (Plaintiff's Exhibit 4). Dr. Silva, Jackson's expert, testified that the four basic gates (i.e., AND gates, OR gates, XOR gates or exclusive-OR gates, and NOT gates) disclosed in the '900 patent's digital logic integrated circuits are identical to the four gates (i.e., AND gates, OR gates, XOR gates, and NOT gates) utilized in microprocessor digital logic integrated circuits, as described by Mr. Slater and as illustrated in Figure 1.1 of his treatise.

[12] The intrinsic evidence, extrinsic evidence, expert testimony, and the learned treatise by Mr. Slater convince the court that a microprocessor programmed to perform the functions of the '900 patent is the equivalent, under Section 112, Paragraph 6, of the digital logic integrated circuitry disclosed in the '900 patent.

IV. Claim Function and Structure Conclusions of Law.

[13] [14] [15] [16] [17] [18] [19] [20] [21] [22] [23] [24] The court must now address the independent claims at issue in this case, Claims 1, 5, 10, 59, 79, and 97. Having considered the intrinsic evidence in this case, the court now finds that the independent Claims at issue have the functions and corresponding structure set forth in the following tables. The court finds that each dependent claim has the function and corresponding structure set forth in the table for the independent claim on which that claim depends plus the function and structure set forth in the following tables for the dependent claims.

A. Independent Claims.

Claim 1

	Claim 1 Language	Function	Corresponding Structure
1.	A phone-line-linked, tone-operated control apparatus for remotely controlling various functions of at least one device, said apparatus comprising:		
A.	**detecting means** coupled to receive tone signals from said phone line,	To couple to receive tone signals from said phone line.	a portion of decoding and control logic 24; integrated circuits including DTMF decoder 20, crystal 40, inverter 47, AND gates 48 and 50 and 52, flip-flops 56 and 58, AND gates 60 and 62
	for detecting at least one predetermined sequence of predetermined tone signals and	To detect at least one predetermined sequence of predetermined tone signals.	
	for producing a corresponding sequence detection signal;	To produce a corresponding sequence detection signal.	
B.	**control means** responsive to said sequence detection signal	To respond to said sequence detection signal.	a portion of decoding and control logic 24; integrated circuits including OR gate 64, flip-flop 66
	for producing a corresponding control signal;	To produce a corresponding control signal.	

wherein said detecting means comprises

A(1).	**first detecting means**		a portion of decoding and control logic 24; integrated circuits
	for producing a first detection signal in	To produce a first detection signal in response to the reception of a	including DTMF decoder 20, AND gates 48, 50, 60, flip-flop 56

	response to the reception of a first predetermined sequence of predetermined tone signals and	first predetermined sequence of predetermined tone signals.	
A(2).	**second detecting means**		a portion of decoding and control logic 24; integrated circuits including DTMF decoder 20, AND gates 50, 52, 62, flip-flop 58
	for producing a second detection signal in response to the reception of a second predetermined sequence of predetermined tone signals;	To produce a second detection signal in response to the reception of a second predetermined sequence of predetermined tone signals.	
wherein said control means is			
B(1).	responsive to said first detection signal for producing a corresponding first control signal and	To respond to said first detection signal for producing a corresponding first control signal	See Section B, supra
B(2).	responsive to said second detection signal for producing a corresponding second control signal;	To respond to said second detection signal for producing a corresponding second control signal.	See Section B, supra
wherein said control means comprises			
B(3).	**dual state means**		a portion of decoding and control logic 24; integrated circuits including OR gate 64, flip-flop 66
	for producing only one of said first control signal and said second control signal at a time; and	To produce only one of said first control signal and said second control signal at a time.	
wherein said first and said second detecting means further include			

A(1)(a), and (A)(2)(a).

gating means		a portion of decoding and control logic 24; integrated circuits including AND gates 60, 62
coupled in circuit	To couple in circuit.	
for disabling production of said first and said second detection signals respectively	To disable production of said first and said second detection signals respectively.	
in response to said second control signal and said first control signal, respectively,	To respond to said second control signal and said first control signal, respectively.	
whereby said apparatus cannot produce said first detection signal and said second detection signal at the same time.	To not produce said first detection signal and said second detection signal at the same time.	

Claim 5

Claim 5 Language	**Function**	**Corresponding Structure**
5. A phone-line-linked, tone-operated control apparatus comprising:		
A. **detecting means** coupled to receive tone signals from said phone line,	To couple to receive tone signals from said phone line.	a portion of decoding and control logic 24; integrated circuits including DTMF decoder 20, crystal 40, inverter 47, AND gates 48 and 50 and 52, flip-flops 56 and 58, AND gates 60 and 62
for detecting at least one predetermined sequence of predetermined tone signals and	To detect at least one predetermined sequence of predetermined tone signals.	
for producing a corresponding sequence detection	To produce a corresponding sequence detection signal.	

	signal;		
B.	**control means** responsive to said sequence detection signal	To respond to said sequence detection signal.	a portion of decoding and control logic 24; integrated circuits including OR gate 64, flip-flop 66
	for producing a corresponding control signal;	To produce a corresponding control signal.	
C.	**access limiting circuit means** coupled with said detecting means	To couple with said detecting means.	break-in prevention system 25; relay 90 and integrated circuits including AND gate 55, OR gate 85, counter 70, buffer 88, exclusive OR gate 95, AND gates 100, 102, 104, 108, 112, 116, 118, 126, flip-flops 106, 110, 114, 122, OR gate 120, counter component 124, inverter 125
	for preventing production of said sequence detection signal	To prevent production of said sequence detection signal until an access sequence comprising a further predetermined sequence of predetermined tone signals is first received on said phone line.	
	until an access sequence comprising		
	a further predetermined sequence of predetermined tone signals is first received on said phone line;		
wherein said access limiting circuit means includes			
C(1).	**gate means**		a portion of decoding and control logic 24; integrated circuit including AND gate 55
	coupled with said detecting means	To couple with said detecting means.	
	for normally preventing response thereof to said tone signals, and	To normally prevent response thereof to said tone signals.	
C(2).	**counter means**		a portion of break-in prevention system 25; integrated circuit including flip-flops 106, 110, 114,
	coupled to said gate	To couple to said gate means and	

means and responsive to said tone signals	responsive to said tone signals.	AND gates 104, 102, 100, 105, 112, and 118
for causing said gate means to enable operation of said detecting means following a predetermined number of tone signals received thereby.	To cause said gate means to enable operation of said detecting means following a predetermined number of tone signals received thereby.	

Claim 10

	Claim 10 Language	Function	Corresponding Structure
10.	A phone-line-linked, tone-operated control apparatus comprising:		
A.	**detecting means** coupled to receive tone signals from said phone line,	To couple to receive tone signals from said phone line.	a portion of decoding and control logic 24; integrated circuits including DTMF decoder 20, crystal 40, inverters 47, AND gates 48 and 50 and 52, flip-flops 56 and 58, AND gates 60 and 62
	for detecting at least one predetermined sequence of predetermined tone signals and	To detect at least one predetermined sequence of predetermined tone signals.	
	for producing a corresponding sequence detection signal;	To produce a corresponding sequence detection signal.	
B.	**control means** responsive to said sequence detection signal	To respond to said sequence detection signal.	a portion of decoding and control logic 24; integrated circuits including OR gate 64, flip-flop 66
	for producing a corresponding control signal;	To produce a corresponding control signal.	
C.	**switching means** responsive to said control signal	To respond to said control signal.	a portion of instrument controllers 26; relay 168

	for activating a given instrument under control; and	To activate a given instrument under control.	
D.	**feedback means** coupled to said switching means	To couple to said switching means.	feedback circuitry 30 and a portion of answering circuitry 22; relay 90 and integrated circuits including buffer 88, exclusive-OR gate 95, opto-coupler or opto-isolator 174; Schmitt trigger 176; RC filter 178, 180; MM V 182
	for producing a verifying signal in response to operation of said switching means for activating said instrument under control;	To produce a verifying signal in response to operation of said switching means for activating said instrument under control.	

wherein said feedback means includes

D(1).	**gate means**		a portion of answering circuitry 22; relay 90 and integrated circuit including exclusive OR gate 95
	coupled with answering circuit means and	To couple with answering circuit means.	
	responsive to said verifying signal for momentarily decoupling said answering circuit means from said phone line and	To respond to said verifying signal for momentarily decoupling said answering circuit means from said phone line.	
	thereby producing an audible signal.	To produce an audible signal.	

Claim 59

Claim 59 Language	Function	Corresponding Structure
59. A phone-line-linked, tone-operated control apparatus for remotely controlling various functions of at least one		

	device, said apparatus comprising:		
A.	**integrated circuit detecting means** coupled to receive DTMF tone signals from said phone line, for detecting at least one predetermined sequence of predetermined DTMF tone signals and for producing a corresponding sequence detection signal;	To couple to receive DTMF signals from said phone line. To detect at least one predetermined sequence of predetermined DTMF tone signals. To produce a corresponding sequence detection signal.	a portion of decoding and control logic 24; integrated circuits including DTMF decoder 20, crystal 40, inverter 47, AND gates 48 and 50 and 52, flip-flops 56 and 58, AND gates 60 and 62
B.	**integrated circuit control means** responsive to said sequence detection signal for producing a corresponding control signal;	To respond to said sequence detection signal. To produce a corresponding control signal.	a portion of decoding and control logic 24; integrated circuits including OR gate 64, flip-flop 66
	wherein said detecting means comprises		
A(1).	**first integrated circuit detecting means** for producing a first detection signal in response to the reception of a first predetermined sequence of predetermined DTMF tone signals and	To produce a first detection signal in response to the reception of a first predetermined sequence of predetermined DTMF tone signals.	a portion of decoding and control logic 24; integrated circuits including DTMF decoder 20, AND gates 48, 50, 60, flip-flop 56
A(2).	**second integrated circuit**		a portion of decoding and control

	detecting means		logic 24; integrated circuits including DTMF decoder 20, AND gates 50, 52, 62, flip-flop 58
	for producing a second detection signal in response to the reception of a second predetermined sequence of predetermined DTMF tone signals;	To produce a second detection signal in response to the reception of a second predetermined sequence of predetermined DTMF tone signals.	
wherein said control means is			
B(1).	responsive to said first detection signal for producing a corresponding first control signal and	To respond to said first detection signal for producing a corresponding first control signal	See Section B, supra
B(2).	responsive to said second detection signal for producing a corresponding second control signal;	To respond to said second detection signal for producing a corresponding second control signal.	See Section B, supra
wherein said control means comprises			
B(3).	**integrated circuit dual state means**		a portion of decoding and control logic 24; integrated circuits including OR gate 64, flip-flop 66
	for producing only one of said first control signal and said second control signal at a time; and	To produce only one of said first control signal and said second control signal at a time.	
where said first and said second integrated circuit detecting means further include			
A(1)(a). and (A)(2)(a).	**integrated circuit gating**		a portion of decoding and control

	means		logic 24; integrated circuits including AND gates 60, 62
	coupled in circuit	To couple in circuit.	
	for disabling production of said first and said second detection signals respectively	To disable production of said first and said second detection signals respectively.	
	in response to said second control signal and said first control signal, respectively,	To respond to said second control signal and said first control signal, respectively.	
	whereby said apparatus cannot produce said first detection signal and said second detection signal at the same time.	To not produce said first detection signal and said second detection signal at the same time.	

Claim 79

	Claim 79 Language	**Function**	**Corresponding Structure**
79.	A phone-line-linked, tone-operated operated control apparatus comprising:		
A.	**integrated circuit detecting means** coupled to receive DTMF tone signals from said phone line,	To couple to receive DTMF tone signals from said phone line.	a portion of decoding and control logic 24; integrated circuits including DTMF decoder 20, crystal 40, inverter 47, AND gates 48 and 50 and 52, flip-flops 56 and 58, AND gates 60 and 62
	for detecting at least one predetermined sequence of predetermined DTMF tone signals and	To detect at least one predetermined sequence of predetermined DTMF tone signals.	
	for producing a corresponding sequence detection signal;	To produce a corresponding sequence detection signal.	

B.	**integrated circuit control means** responsive to said sequence detection signal	To respond to said sequence detection signal.	a portion of decoding and control logic 24; integrated circuits including OR gate 64, flip-flop 66
	for producing a corresponding control signal;	To produce a corresponding control signal.	
C.	**integrated circuit access limiting circuit means** coupled with said detecting means	To couple with said detecting means.	break-in prevention system 25; relay 90 and integrated circuits including AND gate 55, OR gate 85, counter 70, buffer 88, exclusive OR gate 95, AND gates 100, 102, 104, 108, 112, 116, 118, 126, flip-flops 106, 110, 114, 122, OR gate 120, counter component 124, inverter 125
	for preventing production of said sequence detection signal	To prevent production of said sequence detection signal until an access sequence comprising a further predetermined sequence of predetermined DTMF tone signals is first received on said phone line.	
	until an access sequence comprising a further predetermined sequence of predetermined DTMF tone signals is first received on said phone line;		
wherein said access limiting circuit means includes			
C(1).	**integrated circuit gate means**		a portion of decoding and control logic 24; integrated circuit including AND gate 55
	coupled with said detecting means	To couple with said detecting means.	
	for normally preventing response thereof to said DTMF tone signals,	To normally prevent response thereof to said DTMF tone signals.	

	and		
C(2).	**integrated circuit counter means**		a portion of break-in prevention system 25; integrated circuit including flip-flops 106, 110, 114, AND gates 104, 102, 100, 105, 112, and 118.
	coupled to said gate means and responsive to said DTMF tone signals	To couple to said gate means and respond to said DTMF tone signals.	
	for causing said gate means to enable operation of said detecting means following a predetermined number of DTMF tone signals received thereby.	To cause said gate means to enable operation of said detecting means following a predetermined number of DTMF tone #signals# received thereby.	

Claim 97

	Claim 97 Language	Function	Corresponding Structure
97.	A phone-line-linked, tone-operated control apparatus comprising:		
A.	**integrated circuit detecting means** coupled to receive DTMF tone signals from said phone line,	To couple to receive DTMF tone signals from said phone line.	a portion of decoding and control logic 24; integrated circuits including DTMF decoder 20, crystal 40, inverters 47, AND gates 48 and 50 and 52, flip-flops 56 and 58, AND gates 60 and 62
	for detecting at least one predetermined sequence of predetermined DTMF tone signals and	To detect at least one predetermined sequence of predetermined DTMF tone signals.	
	for producing a corresponding sequence detection signal;	To produce a corresponding sequence detection signal.	
B.	**integrated circuit control means** responsive to said sequence detection signal	To respond to said sequence detection signal.	a portion of decoding and control logic 24; integrated circuits including OR gate 64, flip-flop 66

	for producing a corresponding control signal;	To produce a corresponding control signal.	
C.	**integrated circuit switching means** responsive to said control signal	To respond to said control signal.	a portion of instrument controllers 26; relay 168
	for activating a given instrument under control; and	To activate a given instrument under control.	
D.	**integrated circuit feedback means** coupled to said switching means	To couple to said switching means.	feedback circuitry 30 and a portion of answering circuitry 22; relay 90 and integrated circuits including buffer 88, exclusive-OR gate 95, opto-coupler or opto-isolator 174; Schmitt trigger 176; RC filter 178, 180; MMV 182
	for producing a verifying signal in response to operation of said switching means for activating said instrument under control;	To produce a verifying signal in response to operation of said switching means for activating said instrument under control.	

wherein said feedback means includes

D(1).	**integrated circuit gate means**		a portion of answering circuitry 22; relay 90 and integrated circuit including exclusive OR gate 95
	coupled with integrated circuit answering circuit means and	To couple with answering circuit means.	
	responsive to said verifying signal for momentarily decoupling said answering circuit means from said phone line and	To respond to said verifying signal for momentarily decoupling said answering circuit means from said phone line.	

thereby producing an audible signal.	To produce an audible signal.	

B. Dependent Claims.

(1) Claims that depend on Claim 1: 2, 14, 16, 18, and 20.

Claim 2

Claim 2 Language	Function	Corresponding Structure
2. A control apparatus in accordance with claim 1	See Claim 1.	
wherein said detecting means comprises		
A(1). **tone decoding means**		integrated circuit including DTMF decoder 20
responsive to said tone signals	To respond to said tone signals.	
for producing digitally encoded signals corresponding in a predetermined fashion to said tone signals; and	To produce digitally encoded signals corresponding in a predetermined fashion to said tone signals.	
A(2). **digital decoding means**		a portion of decoding and control logic 24; integrated circuits including AND gates 48, 50, 52, 60, 62; flip-flops 56, 58
responsive to predetermined ones of said digitally encoded signals occurring in a predetermined sequence	To respond to predetermined ones of said digitally encoded signals occurring in a predetermined sequence.	
for producing said corresponding sequence detection signal.	To produce said corresponding sequence detection signal.	

Claim 14

Claim 14 Language	Function	Corresponding Structure
14. A control apparatus in accordance with claim 1 and	See Claim 1	

	further including		
	decoupling means		answering circuitry 22; relay 90 and integrated circuits including a portion of DTMF decoder 20, counter 70, buffer 72, AND gate 80, OR gate 85, switch 86, buffer 88
	responsive to a remotely located transmitter going off the telephone line	To respond to a remotely located transmitter going off the telephone line.	
	for disconnecting the control apparatus from the telephone line.	To disconnect the control apparatus from the telephone line.	

Claim 16

	Claim 16 Language	Function	Corresponding Structure
16.	A control apparatus in accordance with claim 1 and further including	See Claim 1.	
	means for coupling said sequence detecting means to said phone line in response to a predetermined number of ring tones received on said phone line.	To couple said sequence detecting means to said phone line in response to a predetermined number of ring tones received on said phone line.	answering circuitry 22; relay 90 and integrated circuits including a portion of DTMF decoder 20, counter component 70, inverter buffers 72, 74, RC filter 76, 78, switch 86, buffer 88

Claim 18

	Claim 18 Language	Function	Corresponding Structure
18.	A control apparatus in accordance with claim 1, further including	See Claim 1.	
C.	**access limiting means**		break-in prevention system 25; relay 90 and integrated circuits including AND gate 55, OR gate 85, counter 70, buffer 88, exclusive OR gate 95, AND gates 100, 102, 104, 108, 112, 116, 118, 126, flip-flops 106, 110, 114, 122, OR gate 120, counter component 124, inverter 125
	coupled with said detecting means,	To couple with said detecting means.	
	for preventing production of said sequence detection signal	To prevent production of said sequence detection signal, until an access sequence comprising a further predetermined sequence of predetermined tone signals is first	
	until an access sequence		

	comprising	received on said phone line.	
	a further predetermined sequence of predetermined tone signals is first received on said phone line;		
wherein said access limiting means includes			
C(1).	**access limiting gate means**		a portion of decoding and control logic 24; integrated circuit including AND gate 55
	coupled with said detecting means	To couple with said detecting means.	
	for normally preventing response thereof to said tone signals, and	To prevent response thereof to said tone #signals.#	
C(2).	**counter means**		a portion of break-in prevention system 25; integrated circuit including flip-flops 106, 110, 114, AND gates 104, 102, 100, 105, 112, and 118
	coupled to said access limiting gate means and responsive to said tone signals	To couple to said access limiting gate means and responsive to said tone signals.	
	for causing said access limiting gate means to enable operation of said detecting means following a predetermined number of tone signals received thereby.	To cause said access limiting gate means to enable operation of said detecting means following a predetermined number of tone signals received thereby.	

Claim 20

Claim 20 Language	Function	Corresponding Structure
20. A control apparatus in accordance with claim 1, further including		
C. **switching means** responsive to said control signal	To respond to said control signal.	a portion of instrument controllers 26; relay 168

	for controlling said device; and		
D.	**feedback means** coupled to said switching means	To couple to said switching means.	feedback circuitry 30 and a portion of answering circuitry 22; relay 90 and integrated circuits including buffer 88, exclusive-OR gate 95, opto-coupler or opto-isolator 174, Schmitt trigger 176, RC filter 178, 180, MMV 182
	for producing a verifying signal in response to the changing of said device from one operating state to another;	To produce a verifying signal in response to the changing of said device from one operating state to another.	

wherein said feedback means includes

D(1).	**gate means**		a portion of answering circuitry 22; relay 90 and integrated circuit including exclusive OR gate 95
	coupled to answering circuit means and	To couple to answering circuit means.	
	responsive to said verifying signal for producing an audible verification signal on said phone line.	To respond to said verifying signal for producing an audible verification signal on said phone line.	

(2) Claims that depend on Claim 5: 32, 33, and 35.

Claim 32

Claim 32 Language	Function	Corresponding Structure
32. A control apparatus in accordance with claim 5, further including	See Claim 5	
decoupling means		answering circuitry 22; relay 90 and integrated circuits including a portion of DTMF decoder 20, counter 70, buffer 72, AND gate
responsive to a remotely located transmitter going	To respond to a remotely located transmitter going off the telephone	

	off the telephone line	line.	80, OR gate 85, switch 86, buffer 88
	for disconnecting the control apparatus from the telephone line.	To disconnect the control apparatus from the telephone line.	

Claim 33

	Claim 33 Language	Function	Structure Described in the Specification
33.	A control apparatus in accordance with claim 5, further including	See Claim 5	
	means for coupling said sequence detecting means to said phone line in response to a predetermined number of ring tones received on said phone line.	To couple said sequence detecting means to said phone line in response to a predetermined number of ring tones received on said phone line.	answering circuitry 22; relay 90 and integrated circuits including a portion of DTMF decoder 20, counter component 70, inverter buffers 72, 74, RC filter 76, 78, switch 86, buffer 88

Claim 35

	Claim 35 Language	Function	Corresponding Structure
35.	A control apparatus in accordance with claim 5, further including		
C.	**switching means** responsive to said control signal	To respond to said control signal for controlling a device.	a portion of instrument controllers 26; relay 168
	for controlling a device; and		
D.	**feedback means** coupled to	To couple to said switching means.	feedback circuitry 30 and a portion
	said switching means		of answering circuitry 22; relay 90 and integrated circuits including buffer 88; exclusive-OR gate 95,
	for producing a verifying signal in response to the changing of said device from one operating state to another;	To produce a verifying signal in response to the changing of said device from one operating state to another.	opto-coupler or opto-isolator 174, Schmitt trigger 176, RC filter 178, 180, MMV 182

wherein said feedback means includes			
D(1).	**gate means**		a portion of answering circuitry 22; relay 90 and integrated circuit including exclusive OR gate 95
	coupled to answering circuit means and	To couple to answering circuit means.	
	responsive to said verifying signal for producing an audible verification signal on said phone line.	To respond to said verifying signal for producing an audible verification signal on said phone line.	

(3) Claims that depend on Claim 10: 45, 46, and 47.

Claim 45

Claim 45 Language	Function	Corresponding Structure
45. A control apparatus in accordance with claim 10, further including		
decoupling means		answering circuitry 22; relay 90 and integrated circuits including a portion of DTMF decoder 20, counter 70, buffer 72, AND gate 80, OR gate 85, switch 86, buffer 88
responsive to a remotely located transmitter going off the telephone line	To respond to a remotely located transmitter going off the telephone line.	
for disconnecting the control apparatus from the telephone line.	To disconnect the control apparatus from the telephone line.	

Claim 46

Claim 46 Language	Function	Structure Described in the Specification
46. A control apparatus in accordance with claim 10, further including		
means for coupling said	To couple said sequence detecting	answering circuitry 22; relay 90

	sequence detecting means to said phone line in response to a predetermined number of ring tones received on said phone line.	means to said phone line in response to a predetermined number of ring tones received on said phone line.	and integrated circuits including a portion of DTMF decoder 20, counter component 70, inverter buffers 72, 74, RC filter 76, 78, switch 86, buffer 88

Claim 47

	Claim 47 Language	**Function**	**Corresponding Structure**
47.	A control apparatus in accordance with claim 10, further including		
C.	**access limiting means**		break-in prevention system 25; relay 90 and integrated circuits including AND gate 55, OR gate 85, counter 70, buffer 88, exclusive OR gate 95, AND gates 100, 102, 104, 108, 112, 116, 118, 126, flip-flops 106, 110, 114, 122, OR gate 120, counter component 124, inverter 125
	coupled with said detecting means,	To couple with said detecting means.	
	for preventing production of said sequence detection signal until an access sequence comprising	To prevent production of said sequence detection signal until an access sequence comprising a further predetermined sequence of predetermined tone signals is first received on said phone line.	
	a further predetermined sequence of predetermined tone signals is first received on said phone line;		
	wherein said access limiting means includes		
C(1).	**access limiting gate means**		a portion of decoding and control logic 24; integrated circuit including AND gate 55
	coupled with said detecting means	To couple with said detecting means.	
	for normally preventing response thereof to said tone signals, and	To normally prevent response thereof to said tone signals.	
C(2).	**counter means**		a portion of break-in prevention system 25; integrated circuit including flip-flops 106, 110, 114,
	coupled to said access	To couple to said access limiting	

limiting gate means and	gate means.	AND gates 104, 102, 100, 105, 112, and 118
responsive to said tone signals	To respond to said tone signals.	
for causing said access limiting gate means to enable operation of said detecting means following a predetermined number of tone signals received thereby.	To cause said access limiting gate means to enable operation of said detecting means following a predetermined number of tone signals received thereby.	

(4) Claims that depend on Claim 59: 60, 62, 63, 64, and 66.

Claim 60

Claim 60 Language	Function	Corresponding Structure
60. A control apparatus in accordance with claim 59	See Claim 59.	
wherein said detecting means comprises		
A(1). **integrated circuit tone decoding means**		integrated circuit including DTMF decoder 20
responsive to said DTMF tone signals	To respond to said DTMF tone signals.	
for producing digitally encoded signals corresponding in a predetermined fashion to said DTMF tone signals; and	To produce digitally encoded signals corresponding in a predetermined fashion to said DTMF tone #signals.#	
A(2). **integrated circuit digital decoding means**		a portion of decoding and control logic 24; integrated circuits including AND gates 48, 50, 52, 60, 62, flip-flops 56, 58
responsive to predetermined ones of said digitally encoded signals occurring in a predetermined sequence	To respond to predetermined ones of said digitally encoded signals occurring in a predetermined sequence.	

for producing said corresponding sequence detection signal.	to produce said corresponding sequence detection signal.	

Claim 62

Claim 62 Language	Function	Corresponding Structure
62. A control apparatus in accordance with claim 59 and further including	See Claim 59.	
integrated circuit decoupling means		answering circuitry 22; relay 90 and integrated circuits including a portion of DTMF decoder 20, counter 70, buffer 72, AND gate 80, OR gate 85, switch 86, buffer 88
responsive to a remotely located transmitter going off the telephone line	To respond to a remotely located transmitter going off the telephone line.	
for disconnecting the control apparatus from the telephone line.	To disconnect the control apparatus from the telephone line.	

Claim 63

Claim 63 Language	Function	Structure Described in the Specification
63. A control apparatus in accordance with claim 59, and further including		
integrated circuit means for coupling said sequence detecting means to said phone line in response to a predetermined number of ring tones received on said phone line.	To couple said sequence detecting means to said phone line in response to a predetermined number of ring tones received on said phone line.	answering circuitry 22; relay 90 and integrated circuits including a portion of DTMF decoder 20, counter component 70, inverter buffers 72, 74, RC filter 76, 78, switch 86, buffer 88

Claim 64

Claim 64 Language	Function	Corresponding Structure
64. A control apparatus in	See Claim 59	

accordance with claim 59, further including

C.	**integrated circuit access limiting means**		break-in prevention system 25; relay 90 and integrated circuits including AND gate 55, OR gate 85, counter 70, buffer 88, exclusive OR gate 95, AND gates 100, 102, 104, 108, 112, 116, 118, 126, flip-flops 106, 110, 114, 122, OR gate 120, counter component 124, inverter 125
	coupled with said detecting means,	To couple with said detecting means.	
	for preventing production of said sequence detection signal	To prevent production of said sequence detection signal until an access sequence comprising a further predetermined sequence of predetermined DTMF tone signals is first received on said phone line.	
	until an access sequence comprising		
	a further predetermined sequence of predetermined DTMF tone signals is first received on said phone line;		

wherein said access limiting means includes

C(1).	**integrated circuit access limiting gate means**		a portion of decoding and control logic 24; integrated circuit including AND gate 55
	coupled with said detecting means	To couple with said detecting means.	
	for normally preventing response thereof to said	To normally prevent response thereof to said DTMF tone signals.	
	DTMF tone signals, and		
C(2).	**integrated circuit counter means**		a portion of break-in prevention system 25; integrated circuit including flip-flops 106, 110, 114, AND gates 104, 102, 100, 105, 112, and 118
	coupled to said access limiting gate means and	To couple to said access limiting gate means and be responsive to	

responsive to said DTMF tone signals	said DTMF tone signals.	
for causing said access limiting gate means to enable operation of said detecting means following a predetermined number of DTMF tone signals received thereby.	To cause said access limiting gate means to enable operation of said detecting means following a predetermined number of DTMF tone signals received thereby.	

Claim 66

Claim 66 Language	Function	Corresponding Structure
66. A control apparatus in accordance with claim 59, further including		
C. **integrated circuit switching means** responsive to said control signal	To respond to said control signal.	a portion of instrument controllers 26; relay 168
for controlling said device; and	To control said device.	
D. **integrated circuit feedback means** coupled to said switching means	To couple to said switching means.	feedback circuitry 30 and a portion of answering circuitry 22; relay 90 and integrated circuits including buffer 88, exclusive-OR gate 95, opto-coupler or opto-isolator 174, Schmitt trigger 176, RC filter 178, 180, MMV 182
for producing a verifying signal in response to the changing of said device from one operating state to another;	To produce a verifying signal in response to the changing of said device from one operating state to another.	
wherein said feedback means includes		
D(1). **integrated circuit gate means**		a portion of answering circuitry 22; relay 90 and integrated circuit including exclusive OR gate 95
coupled to integrated	To couple to integrated circuit	

circuit answering circuit means and	answering circuit means.	
responsive to said verifying signal for producing an audible verification signal on said phone line.	To respond to said verifying signal for producing an audible verification signal on said phone line.	

(5) Claims that depend on Claim 79: 84, 85, and 87.

Claim 84

Claim 84 Language	Function	Corresponding Structure
84. A control apparatus in accordance with claim 79, further including	See Claim 79	
integrated circuit decoupling means responsive to a remotely located transmitter going off the telephone line for disconnecting the control apparatus from the telephone line.	To respond to a remotely located transmitter going off the telephone line. To disconnect the control apparatus from the telephone line.	answering circuitry 22; relay 90 and integrated circuits including a portion of DTMF decoder 20, counter 70, buffer 72, AND gate 80, OR gate 85, switch 86, buffer 88

Claim 85

Claim 85 Language	Function	Corresponding Structure
85. A control apparatus in accordance with claim 79, further including	See Claim 79.	
integrated circuit means for coupling said sequence detecting means to said phone line in response to a predetermined number of ring tones received on said	To couple said sequence detecting means to said phone line in response to a predetermined number of ring tones received on said phone line.	answering circuitry 22; relay 90 and integrated circuits including a portion of DTMF decoder 20, counter component 70, inverter buffers 72, 74, RC filter 76, 78, switch 86, buffer 88

phone line.

Claim 87

	Claim 87 Language	Function	Corresponding Structure
87.	A control apparatus in accordance with claim 79, further including		
C.	**integrated circuit switching means** responsive to said control signal for controlling a device; and	To respond to said control signal.	a portion of instrument controllers 26; relay 168
D.	**integrated circuit feedback means** coupled to said switching means for producing a verifying signal in response to the changing of said device from one operating state to another;	To couple to said switching means. To produce a verifying signal in response to the changing of said device from one operating state to another.	feedback circuitry 30 and a portion of answering circuitry 22; relay 90 and integrated circuits including buffer 88, exclusive-OR gate 95, opto-coupler or opto-isolator 174, Schmitt trigger 176, RC filter 178, 180, MMV 182

wherein said feedback means includes

D(1).	**integrated circuit gate means** coupled to integrated circuit answering circuit means and responsive to said verifying signal for producing an audible verification signal on said phone line.	 To couple to integrated circuit answering circuit means. To respond to said verifying signal for producing an audible verification signal on said phone line.	answering circuitry 22; relay 90 and integrated circuit including exclusive OR gate 95, a portion of DTMF decoder 20; counter component 70, inverter buffers 72, 74, RC filter 76, 78, RC time delay circuit 82, 84, OR gate 85, switch 86, buffer 88, resistor 92

(6) Claims that depend on Claim 97: 99, 100, and 101.

Claim 99

Claim 99 Language	Function	Corresponding Structure
99. A control apparatus in accordance with claim 97, further including		
integrated circuit decoupling means		answering circuitry 22; relay 90 and integrated circuits including a portion of DTMF decoder 20,
responsive to a remotely located transmitter going	To respond to a remotely located transmitter going off the telephone	counter 70, buffer 72, AND gate 80, OR gate 85, switch 86, buffer
off the telephone line	line.	88
for disconnecting the control apparatus from the telephone line.	To disconnect the control apparatus from the telephone line.	

Claim 100

Claim 100 Language	Function	Corresponding Structure
100. A control apparatus in accordance with claim 97, further including		
integrated circuit means for coupling said sequence detecting means to said phone line in response to a predetermined number of ring DTMF tones received on said phone line.	To couple said sequence detecting means to said phone line in response to a predetermined number of ring DTMF tones received on said phone line.	answering circuitry 22; relay 90 and integrated circuits including a portion of DTMF decoder 20, counter component 70, inverter buffers 72, 74, RC filter 76, 78, switch 86, buffer 88

Claim 101

Claim 101 Language	Function	Corresponding Structure
101. A control apparatus in accordance with claim 97, further including		
C. **integrated circuit access**		break-in prevention system 25;

	limiting means		relay 90 and integrated circuits including AND gate 55, OR gate 85, counter 70, buffer 88, exclusive OR gate 95, AND gates 100, 102, 104, 108, 112, 116, 118, 126, flip-flops 106, 110, 114, 122, OR gate 120, counter component 124, inverter 125
	coupled with said detecting means,	To couple with said detecting means.	
	for preventing production of said sequence detection signal until an access sequence comprising	To prevent production of said sequence detection signal until an access sequence comprising a further predetermined sequence of predetermined DTMF tone signals is first received on said phone line.	
	a further predetermined		
	sequence of predetermined DTMF tone signals is first received on said phone line;		
wherein said access limiting means includes			
C(1).	**integrated circuit access limiting gate means**		a portion of decoding and control logic 24; integrated circuit including AND gate 55
	coupled with said detecting means	To couple with said detecting means.	
	for normally preventing response thereof to said DTMF tone signals, and	To normally prevent response thereof to said DTMF tone signals.	
C(2).	**integrated circuit counter means**		a portion of break-in prevention system 25; integrated circuit including flip-flops 106, 110, 114, AND gates 104, 102, 100, 105, 112, and 118
	coupled to said access limiting gate means and	To couple to said access limiting gate means.	
	responsive to said DTMF tone signals	To respond to said DTMF tone signals.	
	for causing said access limiting gate means to enable operation of said detecting means following	To cause said access limiting gate means to enable operation of said detecting means following a predetermined number of DTMF	

a predetermined number of DTMF tone signals received thereby.	tone signals received thereby.

V. Conclusion

The purpose of the Markman hearing and this subsequent order is to construe the claims placed in issue and more specifically the terms highlighted by the parties. This being done, the parties may proceed accordingly with the underlying infringement suit.

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