THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

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opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 27

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte HIROSHI HOSOMIZU, TSUTOMU ICHIKAWA, MAKOTO KAMIYA, MASATOSHI YONEYAMA, and KENZI TUZI

Appeal No. 95-3876
Application 08/222,009[1]

HEARD: November 6, 1998

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

MARTIN, Administrative Patent Judge.

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[1] Application for patent filed April 4, 1994. This application is described by appellants as a continuation of Application Serial No. 07/881,494, filed May 11, 1992, which is a divisional of Application Serial No. 07/554,423, filed July 19, 1990, which is a divisional of Application Serial No. 07/216,381, filed July 8, 1988 (now Patent No. 4,951,081). Appellants claim the benefit under 35 U.S.C. § 119 of Japanese Application No. 173466/1987, filed July 10, 1987.

Appeal No. 95-3876
Application 08/222,009

This is an appeal under 35 U.S.C. § 134 from the examiner's rejection of claims 8-15, all of appellants' pending claims, under § 103 for unpatentability over prior art. References hereinafter to appellants' brief are to the substitute appeal brief filed November 17, 1994.

The subject matter of the invention is an electronic flash device which permits adjustment of the intensity of the flash, thereby permitting the user to select both the shutter speed and the aperture value (Spec. at 4, lines 2-7).

Appellants' Figure 1 shows a flash control circuitry for controlling the intensity of a xenon flash tube Xe in response to flash control signals emitted by a control circuit 7 located in the camera body:

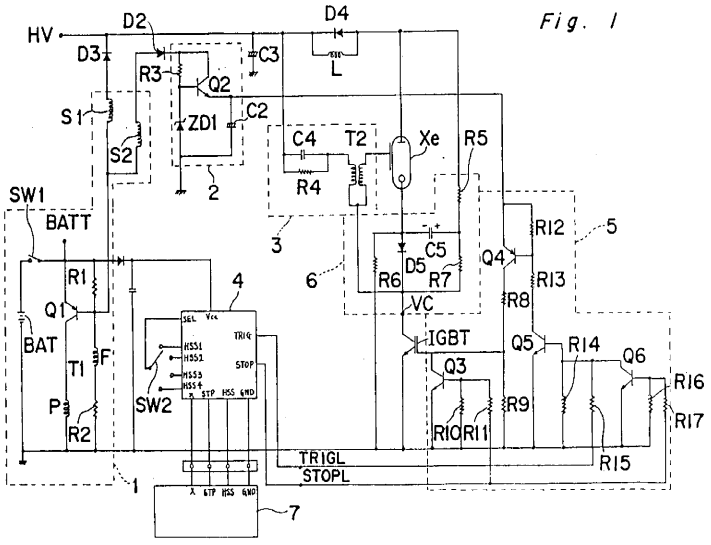


Fig. 1

The flash control circuitry, which is located within the flash unit, includes a power source 1, a constant voltage generating circuit 2, a trigger circuit 3, a control circuit 4, a flash firing control circuit 5, and a voltage doubling circuit 6. The flash tube Xe is connected between the high voltage terminal HV and the collector terminal VC of an insulated gate bipolar transistor (IGBT), which is controlled by flash fire control circuit 5. That circuit is responsive to a trigger signal TRIGL and a flash termination signal STOPL (labeled as

TRIG and STOP in Fig. 5(a)[2]), which are emitted by control circuit 4 in response to command signals issued by control circuit 7 in the camera body.

The specification describes operation of the flash control circuitry of Figure 1 in two different modes, a normal mode (Spec. at 16:20 to 22:10) and a high-speed synchro mode (Spec. at 22:11 to 25:5). The following discussion concerns operation in the normal mode. Referring to Figures 1 and 5(a), prior to commencement of a flash operation, the trigger signal and the flash termination signal are both low and transistors Q3-Q6 and the IGBT are off. Under these conditions, voltage doubling capacitor C5 becomes charged to the potential HV with the polarity indicated by the + and - signs in the figure (Spec. at 16:13-14). When the trigger signal goes high, transistor Q5 turns on, thereby turning on transistor Q4, which connects voltage divider R8-R9 between the DC voltage on capacitor C2 in constant voltage generating circuit 2 and ground (Spec. at 18:6-11). The voltage which is generated at the junction of these resistors is applied to the gate of the IGBT to turn it on (Spec. at 18:14-20), thereby

[2] See Spec. at 18:1-5 and 19:13-24.

grounding the IGBT collector terminal VC. Because the IGBT gate has some inherent capacitance, the value of R8 is selected to be less than or equal to several kilohms in order to improve the response characteristic (Spec. at 18:21-25). The grounding of terminal VC of the IGBT has two effects. The first is to ground one end of the primary and secondary windings of transformer T2, causing the transformer secondary to issue a trigger pulse to the flash tube (Spec. at 18:26 to 19:4). The second effect of grounding terminal VC is to clamp the positive terminal of capacitor C5 of voltage doubling circuit 6 to ground through resistor R7, thereby causing the negative terminal of the capacitor to initially apply a potential of -HV to the lower terminal of the flash tube, whose upper terminal is connected to the +HV terminal (Spec. at 19:4-11). Doubling the voltage applied to flash tube in this manner ensures that the flash tube will be turned on (Spec. at 19:11-12).

When it is time for the flash to be terminated, a flash firing terminating signal STOPL is generated by control circuit 4, which is applied to the bases of transistors Q3 and Q6 to turn them on (Spec. at 19:13 to 20:2). The

specification explains (at 20:3-8) that the turning on of transistor Q3 causes the IGBT to be turned off:

> When the transistor Q3 is so switched on, the gate of the insulated gate bipolar transistor IGBT is grounded and the insulated gate bipolar transistor IGBT is therefore switched off. As a result, no discharge current flow[s] from the flash tube Xe with the flash firing consequently interrupted. . . .

The function of transistor Q6, on the other hand, is described as preventing capacitor C2 in constant voltage source 2 from discharging through transistor Q3 (Spec. at 20:19-26):

> When the transistor Q6 is switched on, the base of the transistor Q5 is grounded and the transistor Q5 is therefore switched off, followed by the switching off of the transistor Q4. Thereby, during a period in which the flash firing terminating signal is generated, the discharge of the capacitor C2 through the transistor Q4, the resistor R8 and the transistor Q3 can be avoided to minimize any possible waste of energies.

The specification does not explain why turning off of the IGBT is attributed to operation of transistor Q3 alone rather than to the combined operation of transistors Q3 and Q6. The explanation may be, as appellants seem to be arguing in their reply brief (at page 2, lines 9-15), that turning on transistor Q3 quickly discharges the current stored in the inherent capacitance of the IGBT gate and thus quickly reduces

the IGBT gate voltage to zero, whereas turning on transistor Q6 (and thus turning off transistors Q5 and Q4) in the absence of transistor Q3 would result in a slower discharge of the current stored in the inherent capacitance of the IGBT gate to

Fig. 6(a)

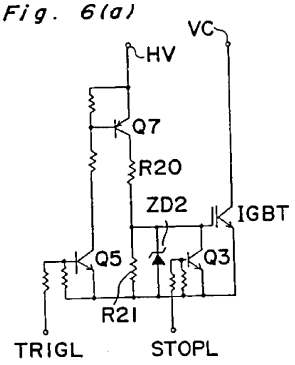
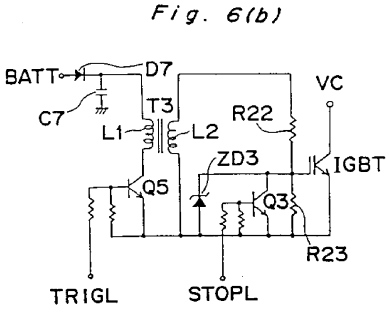


Fig. 6(b)



ground through resistor R9 and thus in a slower reduction of the IGBT gate voltage to zero and a slower turning off of the IGBT.

Figures 6(a) and (b) depict two modifications of the flash fire control circuit 5 shown in the Figure 1 embodiment (Spec. at 25:6 to 27:15):

While both modified circuits include a transistor Q3 like that employed in the Figure 1 embodiment for turning off the IGBT by grounding the gate thereof in response to the flash terminating signal STOPL, neither includes a transistor like transistor Q6 of Figure 1, which is also responsive to the flash terminating signal STOPL.

While, as noted above, the description of the Figure 1 embodiment appears to credit only transistor Q3 with turning off the IGBT, the description of the alternative embodiment shown in Figure 7,[3] which employs transistors Q3-Q6 in the same configuration as in Figure 1, appears to credit transistors Q3 and Q6 with this function: "[W]hen an exposure gets proper, the transistors Q3 and Q5 [sic, Q6?] are switched on and the insulated gate bipolar transistor IGBT is switched off to terminate the flash firing" (Spec. at 30:11-13). Because, as explained infra, I do not understand appellants to be making a § 112, ¶ 6 argument, it is not necessary to decide whether or how the descriptions of the operation of

[3] This embodiment includes an electroluminescent device EL in addition to a xenon flash tube Xe.

transistors Q3-Q6 in the Figure 1 and Figure 7 embodiments can be reconciled.

Claim 14, the sole independent claim on appeal, reads as follows:

> 14. A flash device comprising:
>
> a power source;
>
> a main capacitor adapted to be charged by the power source;
>
> a flash firing unit operable to consume charge stored in the main capacitor to emit flash light;
>
> an insulated gate bipolar transistor disposed in a discharge loop for the main capacitor through the flash firing unit;
>
> means for receiving a flash firing command signal;
>
> first circuit means for generating a flash exciting signal based on the flash firing command signal;
>
> a second circuit means for generating an enabling voltage for the insulated gate bipolar transistor;
>
> trigger means for exciting the flash firing unit in response to the flash exciting signal; and
>
> control means for applying the enabling voltage to a gate of the insulated gate bipolar transistor

> and for removing the enabling voltage at the gate in response to a flash terminating command.[4]

In addition to claim 14, appellants separately argue the patentability of dependent claims 8, 9, 10, and 13.

The references relied on by the examiner are:

Iwata et al. (Iwata) 4,847,538 July 11, 1989

Yasuhide Hayashi, POWER MOSFET IN WHICH THE FOCAL POINT IN THE DEVELOPMENT IS MAKING A TRANSITION TO RESISTING VOLTAGE OF BELOW 100 V AND OVER 800 V, 395 Nikkei Electronics 165-88 (1986).[5]

All of the appealed claims stand rejected under 35 U.S.C. § 103 as unpatentable over Iwata in view of Hayashi.

Figure 3 of Iwata shows control circuitry for a flash lamp 14 which is controlled by an FET 15 which serves the same function as appellants' IGBT:

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[4] Although not discussed by the examiner or the appellants, it appears they are construing the limitation "in response to a flash terminating command" as modifying the "removing" function but not the "applying" function.

[5] Cited in appellants' Information Disclosure Statement filed June 8, 1992 (paper No. 2).

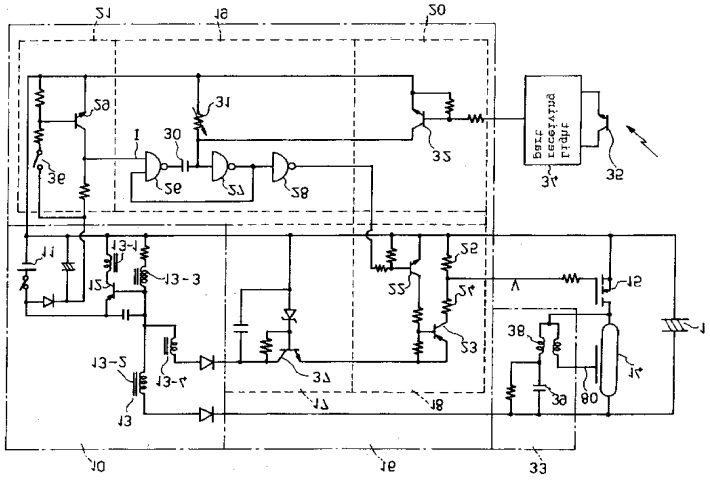


FIG. 3

Iwata explains (col. 3, line 37 to col. 4, line 56) that the conductive state of the flash lamp 14 is controlled by a trigger circuit 33 and by FET 15, which is controlled by a control voltage generation circuit 18. That circuit includes transistors 22 and 23 and resistors 24 and 25 which correspond to transistors Q5 and Q4 and resistors R8 and R9 in appellants' flash fire control circuit 5 (Figs. 1 and 7). Transistors 22 and 23 are turned on when the output signal of NAND gate 28 (waveform B of Fig. 4) in the operation control circuit 19 goes high. Just as turning on appellants'

transistor Q4 connects the voltage divider resistors R8 and R9 between constant voltage source 2 and ground, thereby creating at the junction of the resistors a voltage sufficient to turn on the IGBT, the turning on of Iwata's transistor 23 connects the voltage divider resistors 24 and 25 between the output of constant voltage generation circuit 17 and ground, thereby creating at the junction of those resistors a voltage V (waveform C of Fig. 4) sufficient to turn on the FET. However, Iwata does not employ a transistor like appellants' transistor Q3 for turning off the FET in response to a separate flash terminating signal. Instead, the FET turns off when the output of NAND gate 28 goes low, thereby turning off transistors 22 and 23 and disconnecting the voltage divider 24-25 from constant voltage generation circuit 17, which results in removal of the biasing voltage from the gate of the FET.

The examiner reads the elements of claim 14, except for the IGBT, on Iwata as follows: "Iwata et al[.] shows a power source (11), a main capacitor (1), a flash firing unit (14), the equivalent of an insulated gate bipolar transistor (FET 15), means for receiving (29), first circuit (19), second

circuit (24 and 25), trigger means (33), [and] control means (23)" (August 2, 1993, Office action at 3). The examiner contends, and appellants do not dispute, that it would have been obvious in view of the Hayashi reference to replace Iwata's FET 15 with an IGBT; instead, appellants contend their claims do not read on Iwata thus modified. Specifically, with respect to independent claim 14 they argue (Brief at 5, lines 4-14):

> In contrast to the arrangement disclosed in the Iwata et al[.] patent, in the circuit of the present invention the voltage at the gate of the IGBT is positively removed, so that flash firing quickly stops and the amount of emitted flash light is more accurately controlled. Referring to the circuit of Figure 1, for example, when the firing of the flash is to be terminated, a logic high signal is generated at the STOP terminal of the control circuit 4. This signal renders the transistor Q6 conducting, which in turn brings the transistors Q5 and Q4 into a non-conducting state. As a result, the supply of voltage from the capacitor C2 to the gate of the IGBT is interrupted. At the same time, the transistor Q3 is brought into a conducting state, to lower the voltage at the gate of the IGBT, thereby removing any capacitance component. Consequently, the IGBT is immediately turned off, and the flash is promptly extinguished.
>
> The Iwata et al[.] patent does not disclose, nor otherwise suggest, this concept of removing an enabling voltage at the gate of the FET in response to a flash terminating command, as recited in claim 14. Substituting an insulated gate bipolar transistor for the FET 15, as suggested in the final

> rejection, likewise does not result in such a feature. Accordingly, the Iwata et al[.] patent does not render the subject matter of claim 14 unpatentable, whether considered alone or in combination with the Nikkei Electronics publication [Hayashi]. [Emphasis added.]

Unlike Judge Torczon in his dissenting opinion, I do not view this argument as implicitly invoking the sixth paragraph of 35 U.S.C. § 112. Appellants' description of their invention as the "concept of removing an enabling voltage at the gate of the FET in response to a flash terminating command," coupled with the absence of any express reference to § 112, ¶ 6 or an assertion that Iwata's disclosed circuit 18 is not the same as or equivalent to appellants' claimed "control means," persuades me appellants are arguing that Iwata's control voltage generating circuit 18 fails to perform the recited function of "removing the enabling voltage at the gate [of the IGBT] in response to a flash terminating signal," which function appellants would have us construe in light of their disclosure as requiring that the voltage at the gate of the IGBT be "positively removed." What appellants mean by "positively removed" is explained as follows in the reply brief (at 2, lines 10-20):

> [W]hen the enabling signal to the transistor is merely terminated, as in the circuit of the Iwata et al[.] patent, the enabling voltage which maintains the transistor in a conducting state does not dissipate until such time as the capacitance component of the transistor has discharged. In contrast, when the enabling voltage is removed, as in the present invention, the voltage is actually taken away rather than merely allowed to dissipate. In this regard, it is to be noted that the commonly understood meaning of the word "remove" connotes something more than mere termination or interruption. For example, Webster's New Collegiate Dictionary defines the word as "to change the location, position, station, or residence of." In other words, removal of a physical entity means to positively move it from its current state, rather than merely fail to maintain it in its state. [Original emphasis.]

Appellants' position is unpersuasive for the following reasons. Since neither the term "remove" nor the phrase "removing the enabling voltage" is defined in appellants' specification, that language must be given its broadest reasonable interpretation consistent with appellants' disclosure. See In re Morris, 127 F.3d 1048, 1054, 44 USPQ2d 1023, 1027 (Fed. Cir. 1997) ("the PTO applies to the verbiage of the proposed claims the broadest reasonable meaning of the words in their ordinary usage as they would be understood by one of ordinary skill in the art, taking into account whatever enlightenment by way of definitions or otherwise that may be

afforded by the written description contained in the applicant's specification"). It is also axiomatic that limitations from examples given in the specification cannot be read into the claims. Constant v. Advanced Micro-Devices, Inc., 848 F.2d 1560, 1571, 7 USPQ2d 1057, 1064 (Fed. Cir. 1988); In re Priest, 582 F.2d 33, 37, 199 USPQ 11, 15 (CCPA 1978); and In re Prater, 415 F.2d 1393, 1404-05, 162 USPQ 541, 550-51 (CCPA 1969). Furthermore, the fact that each of appellants' disclosed embodiments of flash fire control circuit 5 employs a transistor Q3 which is directly responsive to the flash terminating signal for short-circuiting the gate of the IGBT to ground is not in and of itself a sufficient basis for construing the claim language as implicitly requiring a device (e.g., a transistor) for short-circuiting the IGBT gate to ground (or, more broadly, to a source of reference potential) in response to the flash terminating signal. See Specialty Composites v. Cabot Corp., 845 F.2d 981, 988, 6 USPQ2d 1601, 1605 (Fed. Cir. 1988) ("Where a specification does not require a limitation, that limitation should not be read from the specification into the claims.") (Original emphasis.); Lemelson v. United States, 752 F.2d

1538, 1551-52, 224 USPQ 526, 534 (Fed. Cir. 1985) ("Even if the specification only discloses apparatus directed to executing automatic prepositioning of the workpiece or the measurement device or both, this does not dictate reading [the "automatic"] limitation into the prepositioning step of the claim.").

Nor do I agree with appellants' contention that the "removal of a physical entity means to positively move it from its current state, rather than merely fail to maintain it in its state" (Reply Brief at, lines 19-20). In fact, appellants' transistor Q3 fails to move the voltage from the inherent gate capacitance to another location; rather, the charge which is stored on the inherent capacitance is rapidly discharged to ground through transistor Q3, which has the effect of rapidly reducing the voltage stored in the inherent capacitance to zero. Iwata's resistor 25 also removes the charge stored in the inherent capacitance and thus reduces the voltage stored therein to zero, albeit at a slower rate than does appellants' transistor Q3.

For the foregoing reasons, I agree with the examiner that the claimed "means for . . . removing the enabling

voltage at the gate in response to a flash terminating signal" is broad enough to describe the operation of Iwata's control voltage generation circuit 18, which responds to a flash terminating signal (i.e., the falling edge of the output signal of NAND gate 28) by turning off transistors 22 and 23, thereby disconnecting the voltage divider resistors 24 and 25 from the constant voltage generating circuit 17 and permitting the current stored in the inherent capacitance of the IGBT gate to discharge to ground through resistor 25, reducing the gate voltage to zero. Because Iwata's control voltage generation circuit 18 performs the function required of the claimed control means, and because appellants have not made a § 112, ¶ 6 argument with respect to this limitation, I would affirm the rejection of claim 14 as unpatentable for obviousness over Iwata in view of Hayashi.

Claim 8 depends on claim 14 and additionally recites a voltage doubler for applying to the flash firing unit a voltage of a value approximately twice the voltage of the main capacitor.

The examiner argues (Answer at 4-5) that this limitation reads on Iwata's DC-DC converter 10, which includes an oscillation

transformer 13 and transistor 12 that converts the low voltage of power source 11 to high voltage (col. 3, lines 36-45). I agree with appellants that this circuitry does not double the voltage on the main capacitor 1 and would therefore reverse the rejection of this claim.

Claim 9 depends on claim 14 and specifies that the flash terminating command disappears subsequent to disappearance of the flash firing command (sic, flash firing command signal). Consistent with the examiner's reading of the claimed "means for receiving a flash firing command signal" on Iwata's transistor 29, I agree with the examiner that the claimed "flash firing command signal" can be read on the short pulse produced beginning at time T_1 when switch 36 is closed, shown as signal A in Figure 4 (col. 4, lines 3-6). Appellants' argument (Reply Brief at 4) that the flash firing command signal corresponds instead to the signal B produced by Iwata's NAND gate 28 lacks sufficient explanation and is not understood. The claimed "flash terminating command" can be read on the output of light receiving means 34, which at time T_3 issues a flash terminating signal (not shown) when the light received from the subject reaches a predetermined value (col.

4, lines 40-45). Although, as appellants correctly note (Brief at 6, lines 7-9), the length of the flash terminating command is not disclosed, it is nevertheless apparent from the signals in Figure 4 that it ends after the end of the flash firing command (signal A). Consequently, I would also affirm the rejection of claim 9.

Claim 10 depends on claim 14 and specifies that the control means includes means for invalidating the flash firing command on the basis of the flash terminating command. In appellants' Figure 1 embodiment, this apparently refers to the fact that the flash terminating signal which is applied to transistor Q5 via transistor Q6 will override a flash exciting signal that is applied to transistor Q5 via resistor R15. Appellants' argument that this claim is patentable for the same reasons as claim 9 (Brief at 6) is unconvincing because it incorrectly assumes that claim 10 depends on claim 9. I would therefore also affirm the rejection of claim 10.

Because claims 11 and 12, which depend on claim 14, are not separately argued, I would treat these claims as standing or falling (in this case, falling) with claim 14.

Claim 13, which is separately argued, depends on claim 14 through unargued claim 12, which recites a constant voltage generating means for applying a predetermined constant voltage to the gate of the IGBT. Claim 13 further limits claim 12 by specifying that the predetermined constant voltage is applied from the main capacitor. Such an arrangement is represented by appellants' Figure 6(a), wherein DC voltage from the main capacitor C3 (Fig. 1) is applied to the IGBT gate when transistor Q7 is turned on by a flash trigger signal (Spec. at 25:14-16). In Figure 3 of Iwata, the DC voltage for developing the gate voltage for FET 15 is provided by constant voltage generation circuit 17, which provides at the emitter of transistor 37 a voltage which is stabilized by a zener diode (col. 3, line 68 to col. 4, line 3). The examiner argues (Answer at 5-6) that it would have been obvious to alternatively obtain the DC voltage for the gate of the FET (or the substituted IGBT) from any suitable source of DC voltage, including Iwata's main capacitor 1. Because appellants have not challenged this reasoning in their opening brief or their reply brief, I would also affirm the rejection of claim 13 for obviousness over the cited prior art.

In summary, I would affirm the § 103 rejection of claims 9-14 based on Iwata in view of Hayashi and would reverse the § 103 rejection of claim 8 based on those references in which decision Judge Barrett concurs in a separate opinion.

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

AFFIRMED-IN-PART

JOHN C. MARTIN
Administrative Patent Judge

BOARD OF PATENT APPEALS AND INTERFERENCES

BARRETT, Administrative Patent Judge, concurring.

I join Administrative Patent Judge (APJ) Martin's opinion. I, too, interpret appellants' argument to be that one function of the "control means," "removing the enabling voltage at the gate [of the insulated gate bipolar transistor IGBT] in response to a flash terminating signal," is not performed, rather than an argument under 35 U.S.C. § 112,

sixth paragraph, that Iwata's structure for performing the function is not the same as or an equivalent of appellants'. Further, I agree with APJ Martin that the function of "removing the enabling voltage at the gate in response to a flash terminating signal" may be broadly construed to read on the function of switching off the voltage to the IGBT, which is performed by the control voltage generation circuit 18 under the control of the operation control circuit 19 in Iwata, and does not positively recite the disclosed function of grounding the gate of the IGBT to quickly switch it off, which is performed by appellants' transistor Q3 in the flash firing control circuit 5. Therefore, I concur with APJ Martin's decision sustaining the rejection of claims 9-14 and reversing the rejection of claim 8. However, in view of APJ Torczon's dissent, I would go further and address why 35 U.S.C. § 112, sixth paragraph, does not require us to consider appellants' transistor Q3 to be part of the structure described in the specification as corresponding to the claimed "control means . . . for removing the enabling voltage at the gate [of the IGBT] in response to a flash terminating signal."

APJ Torczon agrees that the functions of the control means are performed by the control voltage generation circuit 17 in Iwata. However, APJ Torczon concludes that § 112, sixth paragraph, requires us to determine whether the structure in Iwata is the same as or an equivalent of the structure described in the specification as corresponding to the control means and that appellants implicitly invoke § 112, sixth paragraph, by describing structure for performing the function of "removing the enabling voltage." APJ Torczon construes the control means under § 112, sixth paragraph, to cover all of the structure disclosed in appellants' flash firing control circuit 5, including transistors Q3 and Q6, and finds that there is no structure in Iwata which is the same as or equivalent to transistor Q3. Accordingly, APJ Torczon would reverse.

First, as already noted, I concur with APJ Martin that appellants have argued only that the function of "removing the enabling voltage" is performed by transistor Q3. APJ Martin and I agree that the function does not specifically recite the operation of transistor Q3 and does not define over the operation of the control voltage generation circuit 18 in

Iwata. Appellants do not argue that if the function of "removing the enabling voltage" is performed by the control voltage generation circuit 18 in Iwata, the structure for performing the function in Iwata is not the same as or an equivalent of appellants' under § 112, sixth paragraph. In my opinion, as a matter of procedure, we should not address the question of structure under § 112, sixth paragraph, unless argued by appellants in the first instance. See Examination Guidelines for Claims Reciting a Means or Step Plus Function Limitation In Accordance With 35 U.S.C. § 112, 6th Paragraph, 1162 Off. Gaz. Pat. & Trademark Office 59, 59-60 (May 17, 1994) (the examiner initially makes a prima facie case that a limitation is anticipated by showing that a prior art structure performs the function, then the burden of going forth with the evidence shifts to applicant to show that the prior art structure is not the same as or an equivalent of the structure, material, or acts described in the specification); 37 CFR § 1.192(c)(6)(iv) (1994) ("For each rejection under 35 U.S.C.
103, the argument shall specify the errors in the rejection, the specific limitations in the rejected claims which are not

described in the prior art relied on in the rejection, and shall explain how such limitations render the claimed subject matter unobvious over the prior art."). Cf. In re Baxter Travenol Labs., 952 F.2d 388, 391, 21 USPQ2d 1281, 1285 (Fed. Cir. 1991) ("It is not the function of this court to examine the claims in greater detail than argued by an appellant, looking for nonobvious distinctions over the prior art."); In re Wiechert, 370 F.2d 927, 936, 152 USPQ 247, 254 (CCPA 1967) ("This court has uniformly followed the sound rule that an issue raised below which is not argued in this court, even if it has been properly brought here by a reason of appeal, is regarded as abandoned and will not be considered. It is our function as a court to decide disputed issues, not to create them.").

Second, I disagree with APJ Torczon's construction of the control means limitation under § 112, sixth paragraph, to include transistors Q3 and Q6 because I believe it is inconsistent with the principles that claims are given their broadest reasonable interpretation during prosecution in the PTO and that limitations are not to be read into the claims. In my opinion, § 112, sixth paragraph, requires that an

element in mean-plus-function language be construed to cover only the minimum "corresponding structure, material, or acts described in the specification and equivalents thereof" necessary to perform the function. Construing a mean-plus-function limitation to cover more structure than is necessary to perform the function adopts a narrower than necessary interpretation and amounts to reading limitations into the claim, especially where such limitations are used to distinguish over the prior art. I find that the structure to perform the function of "removing the enabling voltage at the gate" can be appellants' transistors Q4 and Q5, which structure finds direct correspondence in transistors 22 and 23 in the control voltage generation circuit 18 of Iwata. Therefore, the "control means . . . for removing the enabling voltage at the gate" does not define over the structure in Iwata even if structure is considered under § 112, sixth paragraph.

Appellants' specification describes that the IGBT is switched off when transistor Q3 is turned on (specification, page 20, lines 3-6): "When the transistor Q3 is so switched on, the gate of the insulated gate bipolar transistor IGBT is

grounded and the insulated gate bipolar transistor IGBT is therefore switched off." The specification also describes that the IGBT is switched off when transistors Q3 and Q6 are turned on (and, hence, transistors Q4 and Q5 are turned off) (specification, page 30, lines 10-13): "Subsequently, when an exposure gets proper, the transistors Q3 and Q5 [sic, Q6] are switched on and the insulated gate bipolar transistor IGBT is switched off to terminate the flash firing." In my opinion, it is apparent from Iwata that appellants' transistors Q4 and Q5 can alone perform the function of "removing the enabling voltage," which is broadly defined as turning off the voltage to the gate of the IGBT. In summary, the function of "removing the enabling voltage" is performed by: (1) switching on transistor Q3; or (2) switching off transistors Q4 and Q5; or (3) both switching on transistor Q3 and switching off transistors Q4 and Q5. I would construe the "control means . . . for removing the enabling voltage at the gate" to correspond any of these structures. Since appellants' transistors Q4 and Q5 are identical to transistors 22 and 23 in Iwata, the claimed "control means . . . for removing the enabling voltage at the gate" does not define

over the structure in Iwata. If this is not what was intended, the solution is, of course, for appellants to amend claim 14 to more precisely define the function or structure of transistor Q3.

Lastly, under APJ Torczon's claim construction, we must consider both transistors Q3 and Q6 to be part of the structure described as corresponding to the control means. Even if this claim construction is what was intended by appellants, in my opinion, this would impermissibly read limitations into claim 14 not required under § 112, sixth paragraph. Transistor Q6 allows transistors Q5 and Q4 to be turned off even when the TRIGL signal is still present, which function is not recited in claim 14. Again, if appellants intend the control means to cover the transistor Q6, the solution is to amend claim 14 to more precisely define the function or structure of the circuit.

) BOARD OF PATENT

LEE E. BARRETT)

APPEALS

Administrative Patent Judge) AND
) INTERFERENCES

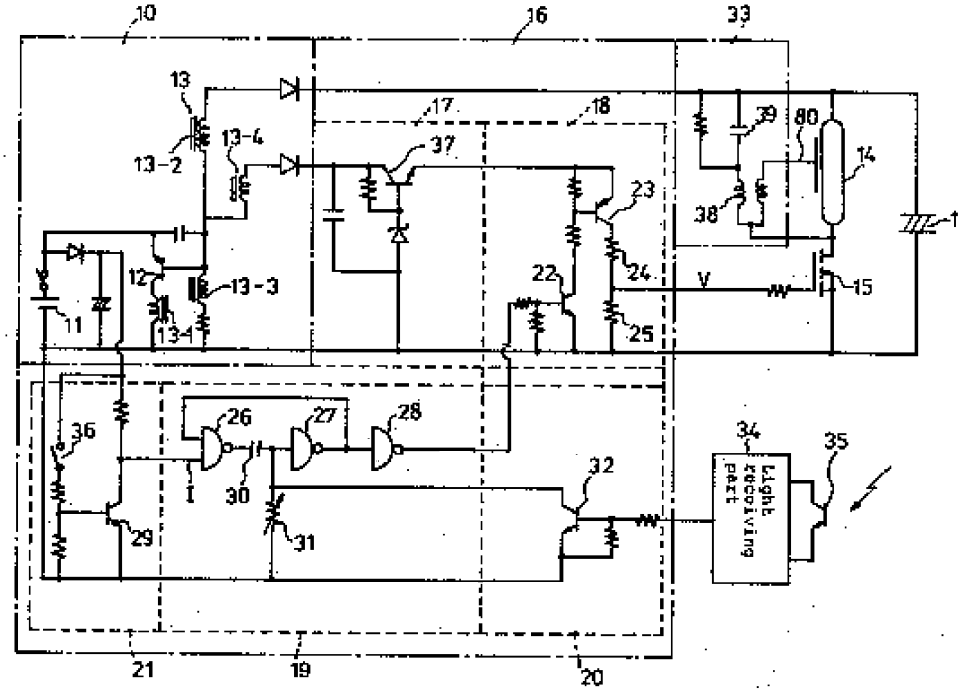
TORCZON, Administrative Patent Judge, concurring-in-part and dissenting-in-part.

The combined teachings of Iwata and Hayashi would not have rendered the subject matter of claim 14 obvious at the time of invention. The remaining claims on appeal properly incorporate the limitations of claim 14. Consequently, I would reverse the rejection of all claims, not just the rejection of claim 8.

The scope of the control means is contested

We must start by construing the claims to define the scope and meaning of each contested limitation. Gechter v. Davidson, 116 F.3d 1454, 1457, 43 USPQ2d 1030, 1032 (Fed. Cir. 1997). At the hearing, counsel for Appellants conceded the combinability of the Iwata and Hayashi references to the extent that an insulated gate bipolar transistor ("IGBT") may

be substituted for the field-effect transistor **15** disclosed in Iwata's Figure 3:



Appellants contend, however, that the proposed combination would not supply the following claimed element:

> control means for applying the enabling voltage to a gate of the insulated gate bipolar transistor and for removing the enabling voltage at the gate in response to a flash terminating command.

We must, therefore, determine the scope and meaning of this limitation in the context of the claim as a whole.

Paragraph six applies to the control means

The first claim-construction issue is whether the contested limitation is a means-plus-function expression governed by section 112[6]. Unidynamics Corp. v. Automatic Prods. Intl., 157 F.3d 1311, 1318, 48 USPQ 1099, 1104 (Fed. Cir. 1998). A limitation written in means-plus-function format is presumed to invoke paragraph six, although the presumption is rebuttable. Sage Prods. v. Devon Indus., 126 F.3d 1420, 1427, 44 USPQ2d 1103, 1109-10 (Fed. Cir. 1997) If a means-plus-function limitation does not recite definite structure in support of its function, it is subject to the requirements of section 112[6]. B. Braun Med. Inc. v. Abbott Labs., 124 F.3d 1419, 1424, 43 USPQ2d 1896, 1899 (Fed. Cir. 1997). The recitation of some structure in a means-plus-function element does not preclude the applicability of paragraph six when it merely serves to further specify the function of the means. Unidynamics Corp., 157 F.3d at 1319, 48 USPQ2d at 1104-05.

The control means does not recite any structure other than the gate of the IGBT. Recitation of the gate is necessary to specify the function: the node to which the

enabling voltage is applied and removed. The IGBT gate is not itself part of the control means; instead it is part of the IGBT, which is a separately limiting element of claim 14. Consequently, we must construe the control means of claim 14 to be subject to paragraph six unless the intrinsic evidence of record indicates otherwise.

The record is, as is unfortunately all too typical in such cases, devoid of any direct analysis by Appellants or the examiner about the applicability of paragraph six. Timing may partly explain this silence because the final office action issued before the watershed decision In re Donaldson Co., 16 F.3d 1189, 1193, 29 USPQ2d 1845, 1848 (Fed. Cir. 1994)(in banc), which arguably changed practice under paragraph six. Whatever the reason, Appellants never expressly invoke paragraph six or the analysis of Donaldson Co. in the record. Appellants' silence, however, is just one item in our analysis of the claim. As previously noted, we must presume that paragraph six applies absent clear indications to the contrary. Silence does not overcome the presumption. Cf. Digital Biometrics, Inc. v. Identix, Inc., 149 F.3d 1335, 1344, 47 USPQ2d 1418, 1424 (Fed. Cir. 1998)

("[T]he actual words of the claim are the controlling focus.").

Appellants implicitly invoke paragraph six in their appeal brief where they rely on specific structures from the specification in explaining the scope of their claim. (Paper No. 18 (Sub. App. Br.) at 5.)

> In contrast to the arrangement disclosed in the Iwata et al patent, in the circuit of the present invention the voltage at the gate of the IGBT is positively removed, so that flash firing quickly stops and the amount of emitted flash light is more accurately controlled. Referring to the circuit of Figure 1, for example, when the firing of the flash is to be terminated, a logic high signal is generated at the STOP terminal of the control circuit 4. This signal renders the transistor Q6 conducting, which in turn bring the transistors Q4 and Q5 into a non-conducting state. As a result, the supply of voltage from the capacitor C2 to the gate of the IGBT is interrupted. At the same time, the transistor Q3 is brought into a conducting state, to lower the voltage at the gate of the IGBT, thereby removing any capacitance component. Consequently, the IGBT is immediately turned off, and the flash is promptly extinguished.

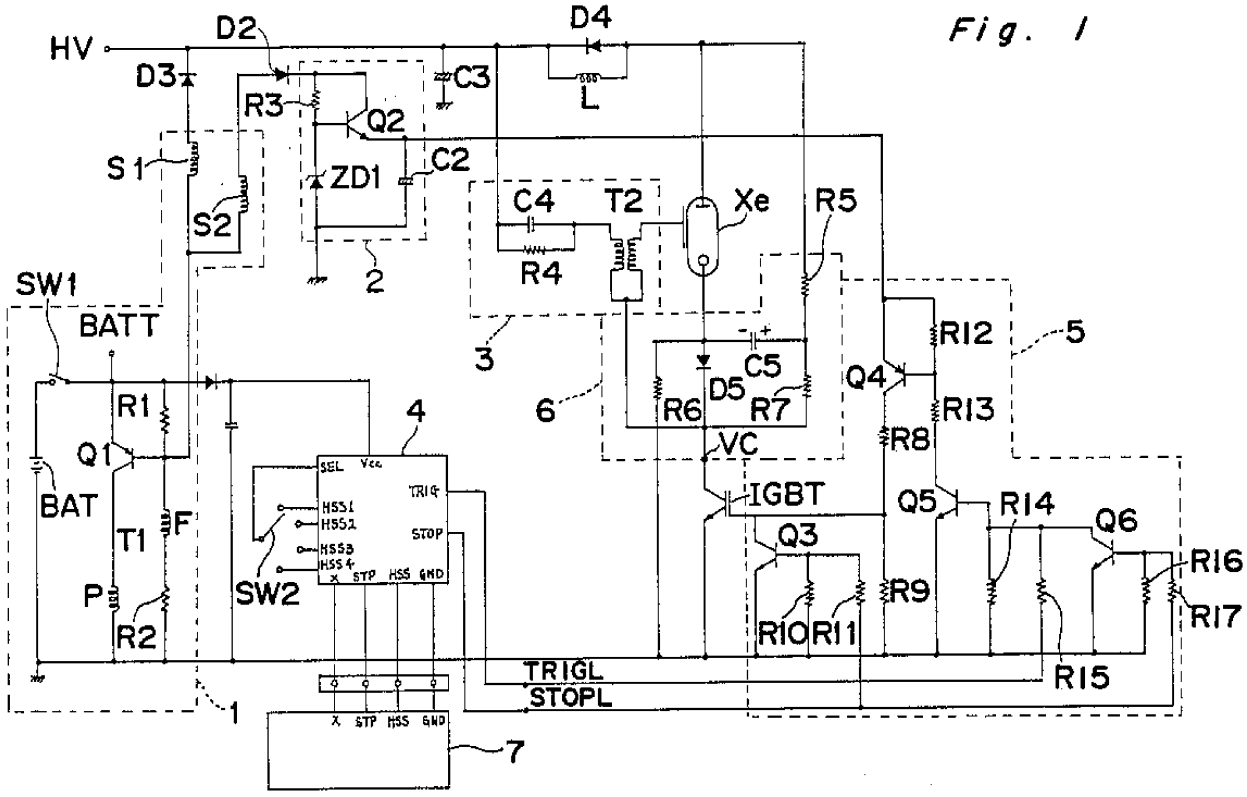


Fig. 1

This argument discusses the removing function in terms of both the Q3 and Q6 transistors and correlates both transistors to the removing means. Appellants' use of this corresponding structure as an example is not inconsistent with paragraph six because that paragraph admits structural equivalents as well.

Finally, at oral argument, counsel for Appellants identified transistors Q3 and Q6 as the structures providing the removal function in the control means, which he identified

as flash firing control circuit **5**. Although controversies may not be resolved on the basis of an oral statement, 37 CFR § 1.2, it is nevertheless worth noting that counsel's statement comports with the simplest reading of the claim and confirms Appellants' intent to be bound by that reading. Consequently, to the extent that we must turn to the intrinsic evidence of record to determine the meaning of the claim, the preponderance of evidence of record supports the inference drawn from the express language of the claim that the control means is subject to the provisions of paragraph six.

The control means corresponds
to the flash firing control circuit

An element of a claim recited in means-plus-function format must be construed to cover the corresponding structure or material described in the specification or its equivalents. 35 U.S.C. § 112[6]. According to the specification,

> [t]he flash firing control circuit 5 is a circuit operable to control the flash firing of the flash tube Xe by controlling the ON-OFF of the insulated gate bipolar transistor IGBT and is constituted by four transistors Q3 to Q6 and ten resistors R8 to R17.

(Paper No. 1 at 10:16-20.) The flash firing control circuit **5** provides the functions (applying and removing an enabling voltage at the gate of the IGBT, i.e., turning the IGBT ON and OFF) claimed for the control means in claim 14 without addition or modification. Counsel confirmed at the hearing that the claimed control means corresponds to the flash firing control circuit **5**. The structure corresponding to the claimed control means is defined to include transistors Q3 and Q6.

The control means includes transistor Q3

Even if we apply paragraph six to claim 14, does it necessarily follow that transistors Q3 and Q6 must be included as corresponding structure? After all, during prosecution, claims are given their broadest reasonable interpretation consistent with the specification as read by a person having ordinary skill in the art. In re Sneed, 710 F.2d 1544, 1548, 218 USPQ 385, 388 (Fed. Cir. 1983). It is not appropriate to interpolate limitations from the specification to avoid unpatentability.

In re Paulsen, 30 F.3d 1475, 1480, 31 USPQ2d 1671, 1674 (Fed. Cir. 1994) ("A limitation is extraneous if it is read into a claim from the specification wholly apart from any need to

interpret particular words or phrases in the claim."). To the extent there is any ambiguity, it is the applicant's burden to choose better language.[6] In re Morris, 127 F.3d 1048, 1056, 44 USPQ2d 1023, 1030 (Fed. Cir. 1997).

The control means corresponds to the flash firing control circuit **5** in its entirety, including transistor Q3. Assuming, arguendo, that we need not include transistor Q3 to satisfy the functions ascribed to the control means, dissecting the control means to exclude transistor Q3 proceeds farther than is necessary or reasonable to construe the claim. The claim sets forth a control means with two functions. A single circuit, the flash firing control circuit **5**, as a whole provides both functions. No other circuit provides these functions. The specification unambiguously includes transistor Q3 in the flash firing control circuit **5**. No embodiment of the flash firing control circuit **5** lacking

[6]Claims serve an important notice function so bromides about according applicants wide latitude in drafting their claims have less force during prosecution when applicants have the opportunity to revise claims. See Morris, 127 F.3d at 1054, 44 USPQ2d at 1028.

transistor Q3 is disclosed.[7] Hence, transistor Q3 is necessarily a structure corresponding to the claimed control means. Excising transistor Q3 from the control means is technically possible in the abstract, but it is not reasonable in light of the unambiguous teachings of the specification. Such excision errantly focusses on whether the corresponding structure has functional equivalents rather than structural equivalents. Appellants have satisfied their burden of clearly linking disclosed structure to the claimed control means. Cf. Braun Med., 124 F.3d at 1424, 43 USPQ2d at 1900 (Clear linkage is the quid pro quo for employing paragraph six format.). Undoubtably, Appellants could have chosen more specific language, but requiring them to do so in the face of a clear linkage to disclosed structure deprives them of the benefit of paragraph six. The burden is now on the Office to provide evidence to render the structures corresponding to the claimed control means obvious.

[7]The embodiments shown in Figures 6(a) and 6(b), however, do not appear to require transistor Q6.

The rejection should be reversed for all claims

Neither the examiner nor my colleagues contend that the references disclose or suggest transistor Q3 or a control means structurally equivalent to the flash firing control circuit **5** with transistor Q3. Absent such a teaching or suggestion, we cannot affirm the rejection of claim 14 on the present record. The remaining claims properly depend from, and thus stand with, claim 14.

Other means are ambiguous

Although claim 14 is patentably distinct from the cited references, the prosecution of this claim illustrates the inadequate analysis typically applied to means-plus-function limitations during prosecution. For instance, the disclosed structure corresponding to the following means elements in claim 14 is, at best, obscure:

> means for receiving a flash firing command signal;
>
> first circuit means for generating a flash exciting signal based on the flash firing command signal; [and]
>
> a second circuit means for generating an enabling voltage for the insulated gate bipolar transistor[.]

At the hearing, counsel advised that the receiving means corresponded to control circuit **4**, the first circuit means to part of control circuit **4**, and the second circuit means to the constant voltage generating circuit **2**. Even if these correspondences are consistent with the specification, they can hardly be said to follow unambiguously from the specification. Unfortunately, the examiner did not adequately press Appellants for clarification.

Claim 12, which depends from claim 14, adds "a constant voltage generating means" that appears to correspond to the constant voltage generating circuit **2**. Under the doctrine of claim differentiation, claim 12 cannot add a limitation that already exists in its parent claim. 35 U.S.C. § 112[4] ("[A] claim in dependent form shall ... specify a further limitation[.]"). The fact that counsel identified a correspondence inconsistent with the doctrine of claim differentiation heightens the impression that the recited means limitations are not well drafted. Since claim 14 stands rejected after this appeal, Appellants should avail themselves of the opportunity during any further prosecution to clarify the meaning of the recited means elements. "It is the

applicants' burden to precisely define the invention".

Morris, 127 F.3d at 1056, 44 USPQ2d at 1029. The fact that Appellants failed in their burden to link these claim elements adequately does not derogate from the sufficiency of the linkage for the claimed control means.

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