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STATEMENT OF THE CASE

Appellants appeal under 35 U.S.C. § 134(a) from the Examiner’s Final Rejection of claims 17–30, which are all the claims pending in the application. We have jurisdiction under 35 U.S.C. § 6(b).

We reverse.\(^2\)

\(^1\) Appellants identify ARM Limited as the real party in interest. (App. Br. 3.)

CLAIMED INVENTION

The claims are directed to a method for “decod[ing] an encoded video bitstream” using “a first parsing unit and a second parsing unit, each configured to independently parse the encoded video bitstream to derive” a “full set of parsing state information, such that any dependencies reliant on that parsing state information can be resolved in either parsing unit,” the full set of parsing state information having “parsing state information . . . on which subsequent parsing of the encoded video bitstream at least partially depends.” (Spec. 4:20–22; Abstract.)

Independent claim 17, reproduced below, is illustrative of the claimed subject matter:

17. A method of decoding an encoded video bitstream, said method comprising the steps of:
   receiving said encoded video bitstream comprising frame header information and macroblock information, said frame header information defining a sequence of frames and each frame being composed of macroblocks represented by said macroblock information;
   parsing said encoded video bitstream using a first parsing unit and a second parsing unit, each parsing unit independently deriving a full set of parsing state information from said encoded video bitstream on which subsequent parsing of said encoded video bitstream at least partially depends and which identifies data dependencies of frames in said encoded video bitstream, and identifying macroblock information for decoding, and said parsing step includes parsing all of said frame header information in both said first parsing unit and in said second parsing unit such that each parsing unit maintains said full set of said parsing state information for said encoded video bitstream; and
   allocating each frame of macroblock information to one of said first parsing unit and said second parsing unit, wherein said first parsing unit and said second parsing unit each parse said macroblock information, skipping macroblock information
allocated to the other parsing unit, the full set parsing state information derived by each parsing unit identifying data dependencies of at least one frame allocated to the other parsing unit.

(App. Br. 17–18 (Claims App’x.).)

REJECTIONS & REFERENCES

(1) Claim 17 stands rejected under 35 U.S.C. § 112(b) or 35 U.S.C. § 112 (pre-AIA), second paragraph, as being indefinite. (Final Act. 5.)

(2) Claims 17–30 stand rejected under 35 U.S.C. § 103(a) based on Chen et al. (The Emerging MVC Standard for 3D Video Services, EURASIP Journal on Advances in Signal Processing (2009: 786015) 1–13 (2009); “Chen”) and Nam et al. (Parallel Parsing of MPEG Video in Heterogeneous Distributed Environment, High-Speed Networks and Multimedia Communications (HSNMC) 264–274 (2003); “Nam”). (Final Act. 6–14.)

ANALYSIS

Rejection of Claim 17 under 35 U.S.C. § 112(b) or 35 U.S.C. § 112 (pre-AIA), second paragraph

In support of the § 112, second paragraph rejection of claim 17 for being indefinite, the Examiner finds the claimed “full set of parsing state information’ is unclear to a skilled artisan. It is unclear what constitutes a full set, what parsing state information is, what form it takes, and how it is derived.” (Final Act. 5; see also Ans. 12–13.)

Appellants argue one of ordinary skill in the art would understand the meaning of “full set of parsing state information” from Appellants’
Specification and the details recited in claim 17. (Reply Br. 3–5; App. Br. 9–10.) We concur with Appellants that the limitation “full set of parsing state information” is clear in view of Appellants’ Specification. Particularly, Appellants’ Specification explains the “full set of parsing state information” is information about dependencies between frames in the full video stream, such information enabling frames’ dependencies to be resolved by either parsing unit. (Spec. 4:20–22; see also Spec. 6:16–19, 11:11–13.) The “full set of parsing state information” is obtained by “pars[ing] all frame header information in the video bitstream”; thus, “[s]ince both the first parsing unit and second parsing unit parse all frame header information in the video bitstream, each is able to maintain a full parsing decode state entirely independently of the other.” (Spec. 4:29–31; see also Spec. 6:2, 12:17–20, 13:14–19, 14:12–14, 15:3–9, Fig. 4A.) That is, the “full set of parsing state information” is “data associated with the performance of parsing, which indicates data dependencies of at least one frame allocated to the other parsing unit, which is used in subsequent parsing of the encoded video bitstream[sic].” (Reply Br. 5; see also App. Br. 10.)

In conclusion, the limitation “full set of parsing state information” may be broad in scope and encompass a variety of parsing information, but when interpreted in light of Appellants’ Specification, we do not consider it to be indefinite.

In support of the § 112, second paragraph rejection, the Examiner also finds the claimed “dependencies” are unclear. (Final Act. 5.) Particularly, the Examiner finds (i) “claim [17] recites that subsequent parsing at least partially depends on the parsing state information, but neither the claims nor the Specification explain what the particular dependency relationship is” or
“how subsequent parsing can be partially dependent,” and (ii) the limitation “‘identifies data dependencies of frames,’ is too broad to be definite because the skilled artisan is aware of a large number of data elements that identify in some wa[y] data dependencies.” (Final Act. 5; Ans. 13.)

Appellants argue the terms “partially depends” and “dependencies” are discussed in the Specification, and one of ordinary skill in the art would understand the meaning of these terms. (App. Br. 9; Reply Br. 5.) We concur with Appellants; it is clear from Appellants’ Specification, what the claims are referring to as “dependencies” and “partial dependence” when parsing a bitstream. Numerous examples in Appellants’ originally filed Specification discuss “dependencies” of frames in an encoded video bitstream. (See Spec. 14:11–25 (“some frames (B frames) [for which] video encoding efficiency is gained by introducing a parsing dependency between frames, such that in order to correctly parse a later frame, reference to previously parsed earlier frame is necessary. This is illustrated in Figure 4A” describing “a ‘co-located frame data dependency’, meaning that a macroblock in a later frame will depend on a macroblock in an earlier frame at the same spatial location within the frame”); see also Spec. 7:6–12, 8:11–12.) Further, the claimed parsing state information as information “on which subsequent parsing of said encoded video bitstream at least partially depends” refers to “data relating to state associated with performing parsing, which is used in subsequent parsing of the encoded video bitstream”; for example, subsequent parsing can be partially dependent when a data dependency between two frames affects the order in which the frames can be parsed. (Reply Br. 4; see also App. Br. 10.) The “Breadth [of a claim] is
not to be equated with indefiniteness.” In re Miller, 441 F.2d 689, 693 (CCPA 1971).

We are also unpersuaded that claim 17 would be unclear because the parsing step “is drafted in narrative form” enumerating sub-steps. (See Final Act. 5.) We agree with Appellants the “parsing” step is clear, and the step’s “narrative” description assists in understanding the interdependencies between the steps and features recited in claim 17. (App. Br. 10.)

Accordingly, we do not sustain the Examiner’s rejection of claim 17 under 35 U.S.C. § 112 second paragraph.

§ 103(a) Rejection of Claims 17–30

Claim 17 requires parsing frame header information of an encoded video bitstream in both first and second parsing units such that each parsing unit (i) independently derives a full set of parsing state information from the bitstream, and (ii) maintains the full set of parsing state information that identifies data dependencies of the bitstream’s frames and identifies data dependencies of at least one frame allocated to the other parsing unit.

The Examiner finds Chen teaches two processors P0 and P1 (of a multiview video coding (MVC) decoder) independently derive and maintain a full set of parsing state information, as claimed. (Final Act. 7–8 (citing Chen §§ 1.1, 1.2.3, 6); Ans. 14–16 (citing Chen §§ 2, 3, Fig. 8).) We do not agree.

We agree with Appellants that Chen does not teach or suggest a full set of parsing state information—which identifies data dependencies of at least one frame allocated to the other parsing unit—being derived and maintained by each of first and second parsing units, as required by claim
17. (Reply Br. 8–9; App. Br. 15.) Claim 17 requires two initial parsing operations, independently performed on a video bitstream by two parsing units, to derive the same full set of parsing state information. In contrast, Chen merely discloses processor P0 decodes frames of one view (view 0, e.g., a left eye view) and processor P1 decodes frames of another view (view 1, e.g., a right eye view), but does not teach that processors P0 and P1 independently derive and maintain the same parsing state information. (See Chen § 6, p. 10, col. 2.) Rather, each parsing unit (processor) in Chen “only acquires information regarding its own packets” assigned for decoding (Reply Br. 8–9; see Chen § 6.)

Chen also does not teach that processors P0 and P1 each maintains parsing state information that identifies data dependencies of at least one frame allocated to the other parsing unit, as claim 17 recites. For example, Chen’s processor P1 only identifies its own view’s dependency on (and awaits notification regarding) another view (view 0) allocated to processor P0, but processor P1 does not maintain information identifying data dependencies of view 0 allocated to processor P0. (Appeal Br. 15; see Chen Fig. 9.) Further, the Examiner has not responded to Appellants’ arguments in the Answer. For example, the Examiner states Chen’s “decoder maintains a full set of parsing state information—e.g., maintains information necessary to parse the bitstream” (see Ans. 15); however, this does not teach that Chen’s two processors P0 and P1 (included in the decoder) each maintains a full set of parsing state information identifying data dependencies, as claimed (Reply Br. 7–8; App. Br. 13–14). And the Examiner states “information necessary to parse the multiview bitstream—may be extracted and used to identify dependencies of frames allocated to one o[r] the other
parsing units” (see Ans. 16); however, this does not teach each processor maintaining information on data dependencies of at least one frame allocated to the other processor (App. Br. 15).

The Examiner also has not shown that the additional teachings of Nam make up for the above-noted deficiencies of Chen. (App. Br. 14; Reply Br. 7.) Thus, for the reasons set forth above, we do not sustain the Examiner’s rejection of independent claim 17 and claims 18–30 dependent therefrom.

DECISION

The Examiner’s rejection of claim 17 under 35 U.S.C. § 112(b) or 35 U.S.C. § 112 (pre-AIA), second paragraph, is reversed.

The Examiner’s rejection of claims 17–30 under 35 U.S.C. § 103(a) is reversed.

REVERSED