A CDCL(T) problem state is a five-tuple $(M; N; U; k; C)$ where N is the propositional abstraction of some clause set N', $N = \mathtt{atr}(N')$, M a sequence of annotated propositional literals, U is a set of detived propositional clauses, $k \in \mathbb{N} \cup \{-1\}$, and C is a propositional clause or $\top$ or $\bot$. In particular, the following states can be distinguished:

$(\epsilon; N; \emptyset; 0; \top)$	is the start state for some clause set N
$(M; N; U; -1; \top)$	is a final state, where $\mathtt{atr}^{-1}(M) \models_{\mathcal{T}} N'$
$(M; N; U; k; \bot)$	is a final state, where N' has no model
$(M; N; U; k; \top)$	is a model search state if $k \neq 0$
$(M; N; U; k; D)$	is a backtracking state if $D \notin \{\top, \bot\}$

Propagate $(M; N; U; k; \top) \Rightarrow_{\text{CDCL}} (ML^{C \vee L}; N; U; k; \top)$
provided $C \vee L \in (N \cup U)$, $M \models \neg C$, and L is undefined in M

Decide $(M; N; U; k; \top) \Rightarrow_{\text{CDCL}} (ML^{k+1}; N; U; k+1; \top)$
provided L is undefined in M

Conflict $(M; N; U; k; \top) \Rightarrow_{\text{CDCL}} (M; N; U; k; D)$
provided $D \in (N \cup U)$ and $M \models \neg D$

Skip $(ML^{C\lor L}; N; U; k; D) \Rightarrow_{\text{CDCL}} (M; N; U; k; D)$
provided $D \notin \{\top, \bot\}$ and $\text{comp}(L)$ does not occur in D

Resolve $(ML^{C\lor L}; N; U; k; D \lor \text{comp}(L)) \Rightarrow_{\text{CDCL}}$
$(M; N; U; k; D \lor C)$
provided D is of level k

Backtrack $(M_1 K^{i+1} M_2; N; U; k; D \lor L) \Rightarrow_{\text{CDCL}}$
$(M_1 L^{D\lor L}; N; U \cup \{D \lor L\}; i; \top)$
provided L is of level k and D is of level i.

Restart $(M; N; U; k; \top) \Rightarrow_{\text{CDCL}} (\epsilon; N; U; 0; \top)$
provided $M \not\models N$

Forget $(M; N; U \uplus \{C\}; k; \top) \Rightarrow_{\text{CDCL}} (M; N; U; k; \top)$
provided $M \not\models N$

Note that these rules are exactly the rules of CDCL from Section 2.9. The only difference that any normal form $(M; N; U; k; \top)$ was a final state in CDCL, but not in CDCL(T) because $k \neq -1$. On the other hand, if CDCL derives the empty clause, i.e., $\bot$, then this is also a final state for CDCL(T), see Lemma 7.2.1. The $\mathcal{T}$ rules are missing that in particular check whether the propoistional model is in fact also a theory model.

$\mathcal{T}$**-Success** $(M; N; U; k; \top) \Rightarrow_{\text{CDCL(T)}} (M; N; U; -1; \top)$
provided $M \models (N \cup U)$ and $\text{atr}^{-1}(M)$ is $\mathcal{T}$-satisfiable

$\mathcal{T}$**-Propagate** $(M; N; U; k; \top) \Rightarrow_{\text{CDCL(T)}} (ML^{C \vee L}; N; U; k; \top)$
provided , $\text{atr}^{-1}(M)$ is $\mathcal{T}$-satisfiable, L is undefined in M but $\text{atom}(L)$ occurs in $N \cup U$, and there are literals $L_1, \ldots, L_n$ from M with $\text{atr}^{-1}(L_1), \ldots, \text{atr}^{-1}(L_n) \models_{\mathcal{T}} \text{atr}^{-1}(L)$ and $C = \text{comp}(L_1) \vee \ldots \vee \text{comp}(L_n)$

$\mathcal{T}$**-Conflict** $(M; N; U; k; \top) \Rightarrow_{\text{CDCL(T)}}$
$(\epsilon; N; U \cup \{\neg L_1 \vee \ldots \vee \neg L_n\}; 0; \top)$
provided there are literals $L_1, \ldots, L_n$ from M with $\text{atr}^{-1}(L_1), \ldots, \text{atr}^{-1}(L_n) \models_{\mathcal{T}} \bot$