

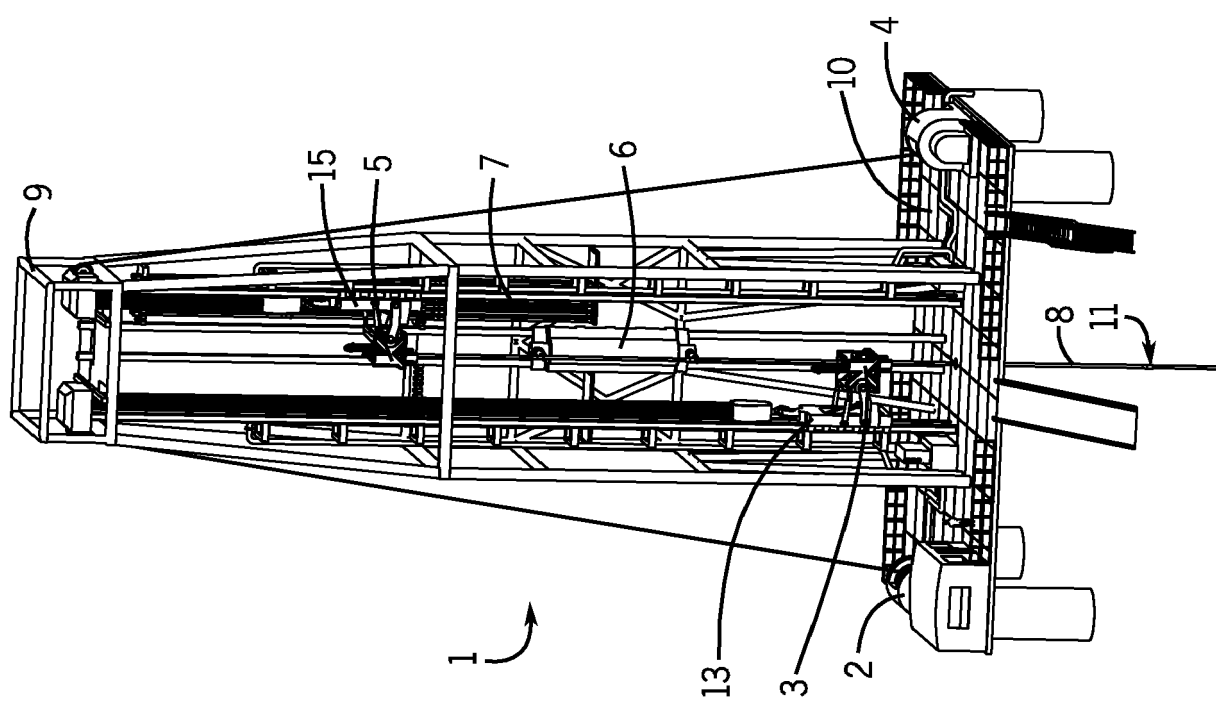


FIG. 1

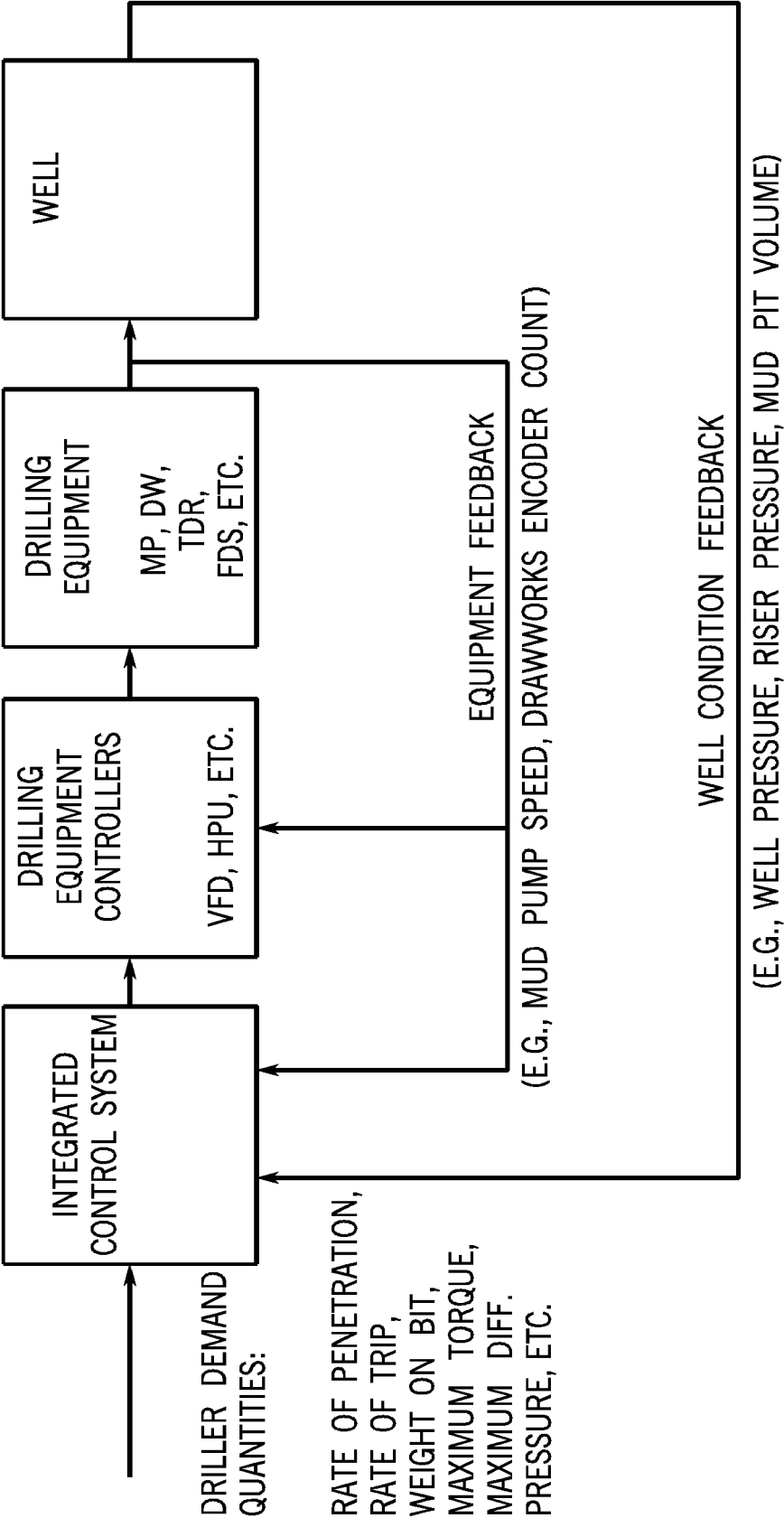
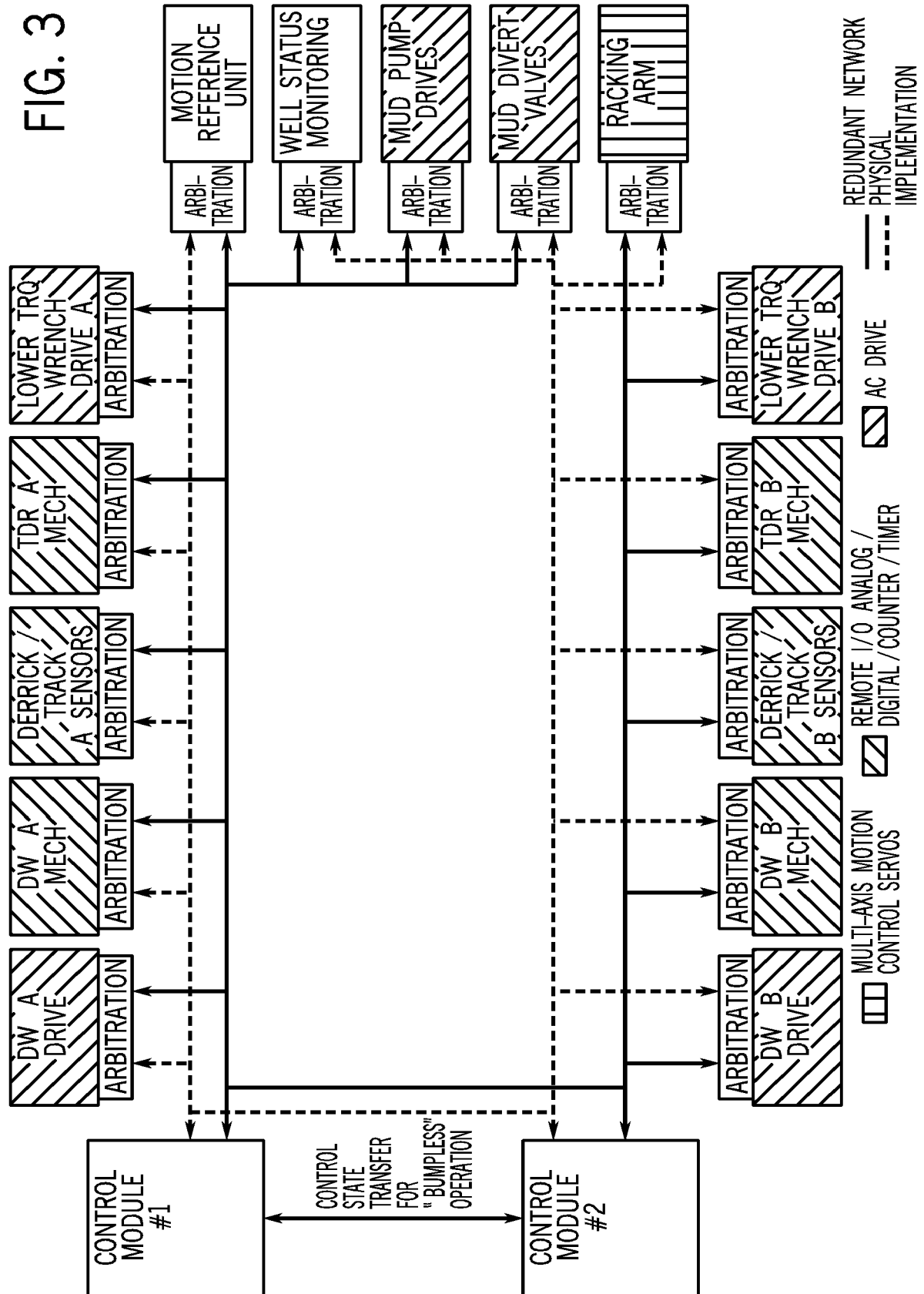
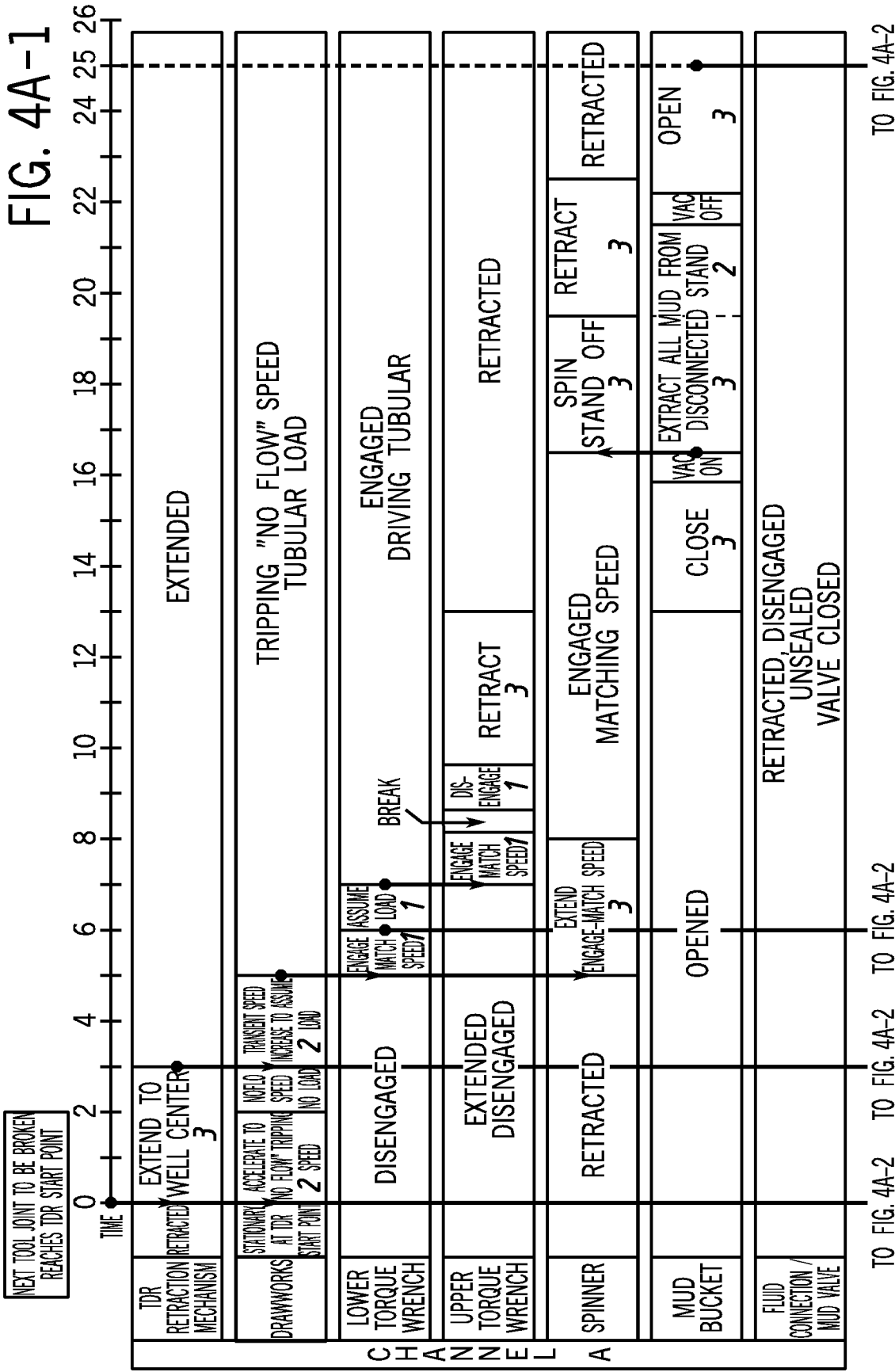


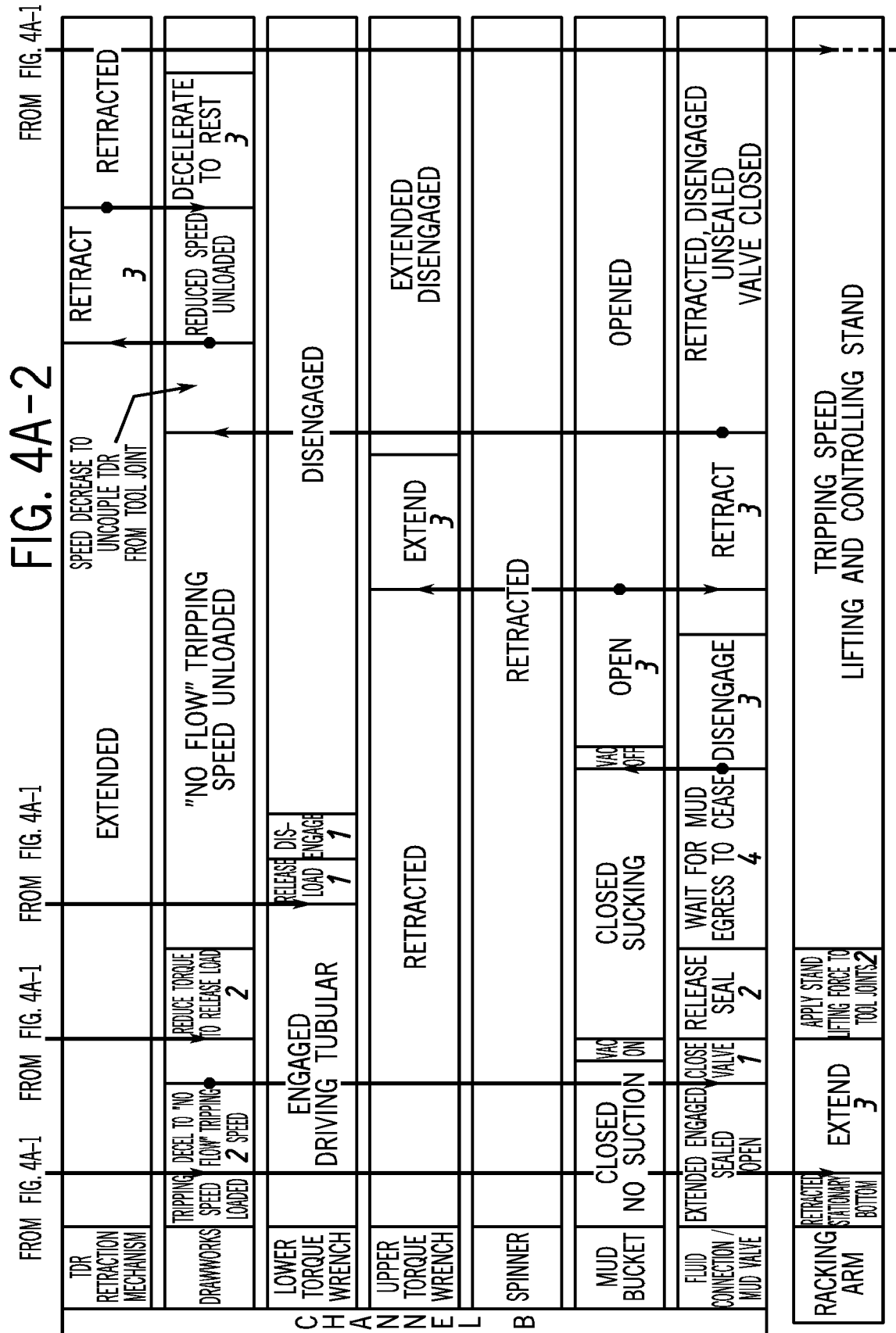
FIG. 2

FIG. 3





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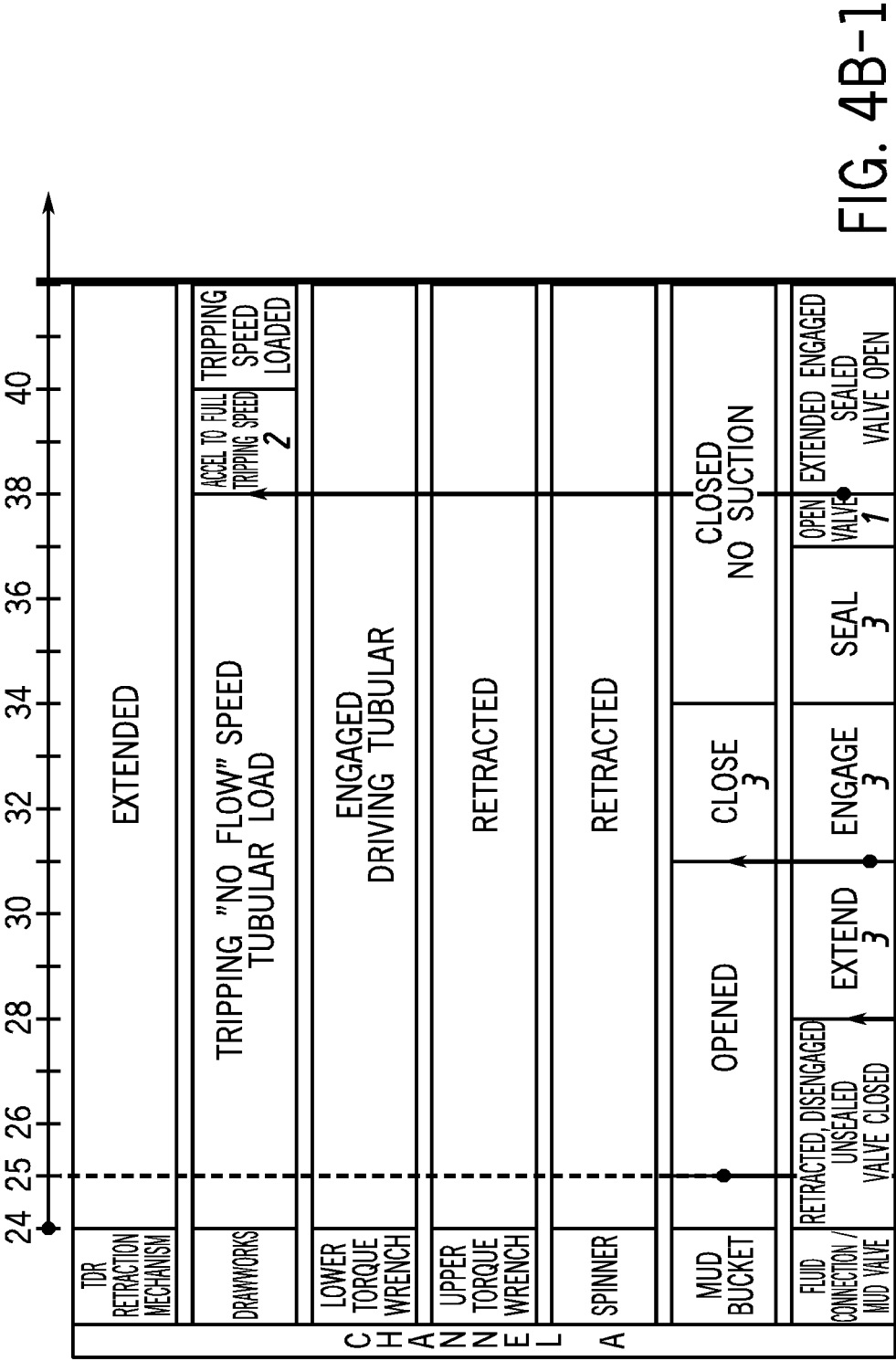


FIG. 4B-1

TO FIG. 4B-2 FROM FIG. 4B-2

FROM FIG. 4B-1 TO FIG. 4B-1

CHANNEL B					RETRACTED		
TDR RETRACTION MECHANISM							
DRAWWORKS	ACCELERATE TO LOWERING SPEED 3		LOWER TO SCALE	DECELERATE TO REST 3	STATIONARY AT TDR START POINT		
LOWER TORQUE WRENCH					DISENGAGED		
UPPER TORQUE WRENCH					EXTENDED DISENGAGED		
SPINNER					RETRACTED		
MUD BUCKET					OPENED		
FLUID CONNECTION / MUD VALVE					RETRACTED, DISENGAGED UNSEALED VALVE CLOSED		
RACKING ARM	REMOVE STAND FROM TDR 3	DECELERATE TO REST 2	MOVE STAND TO RACK NOT TO SCALE	RETRACT NOT TO SCALE	LOWER TO CYCLE START POINT (BOTTOM OF TRAVEL) NOT TO SCALE	RETRACTED STATIONARY	

FIG. 4B-2

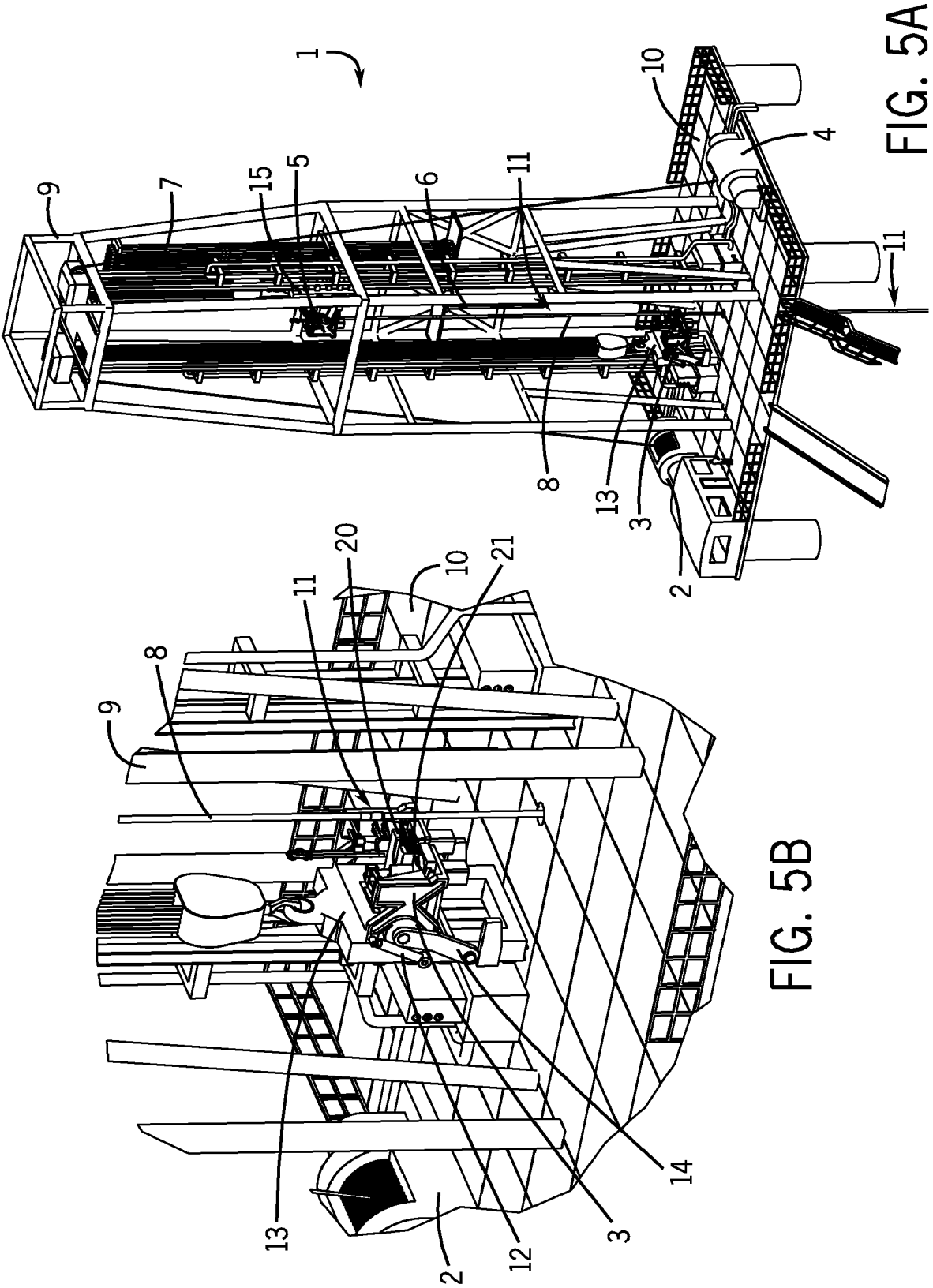
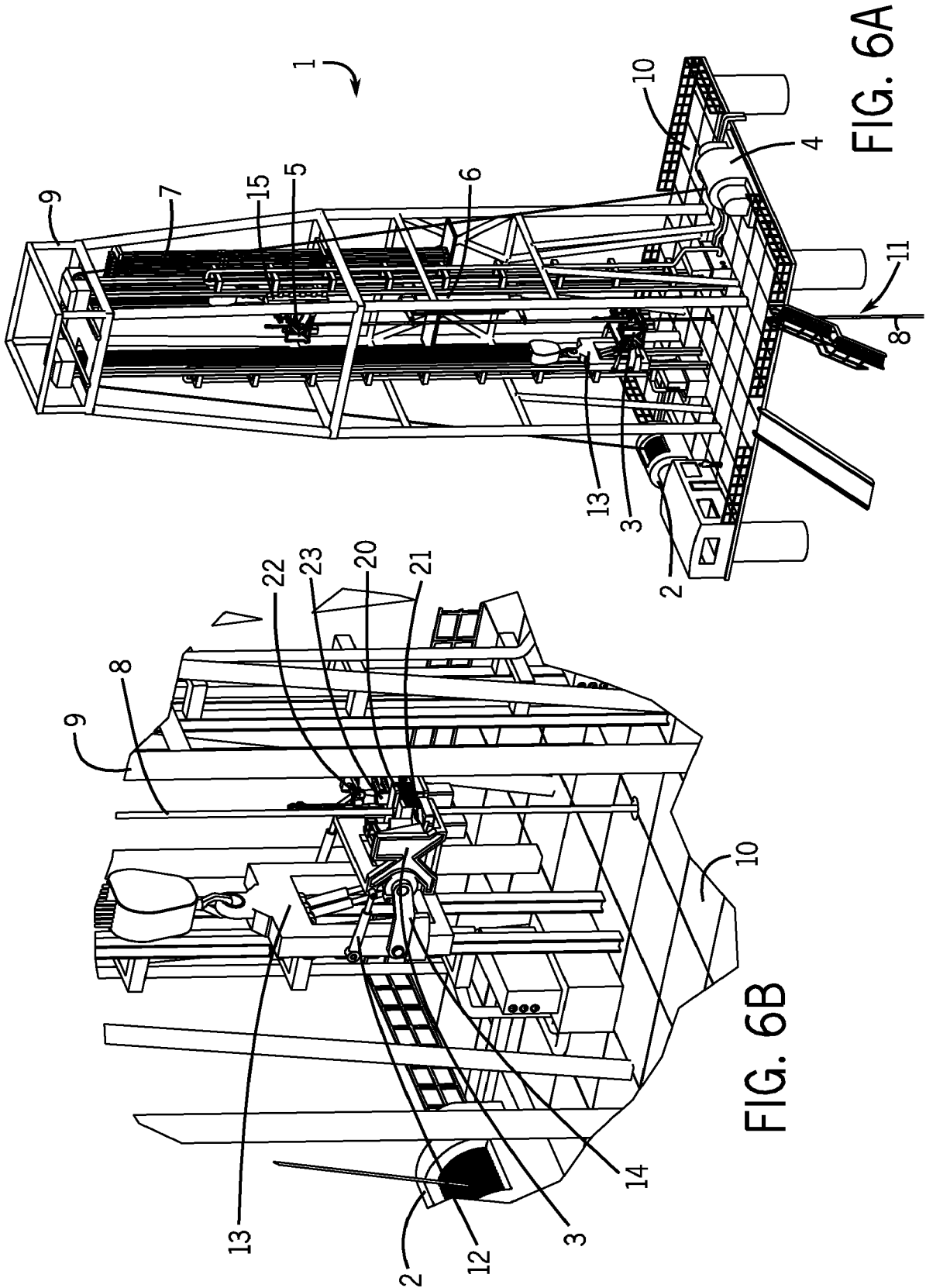
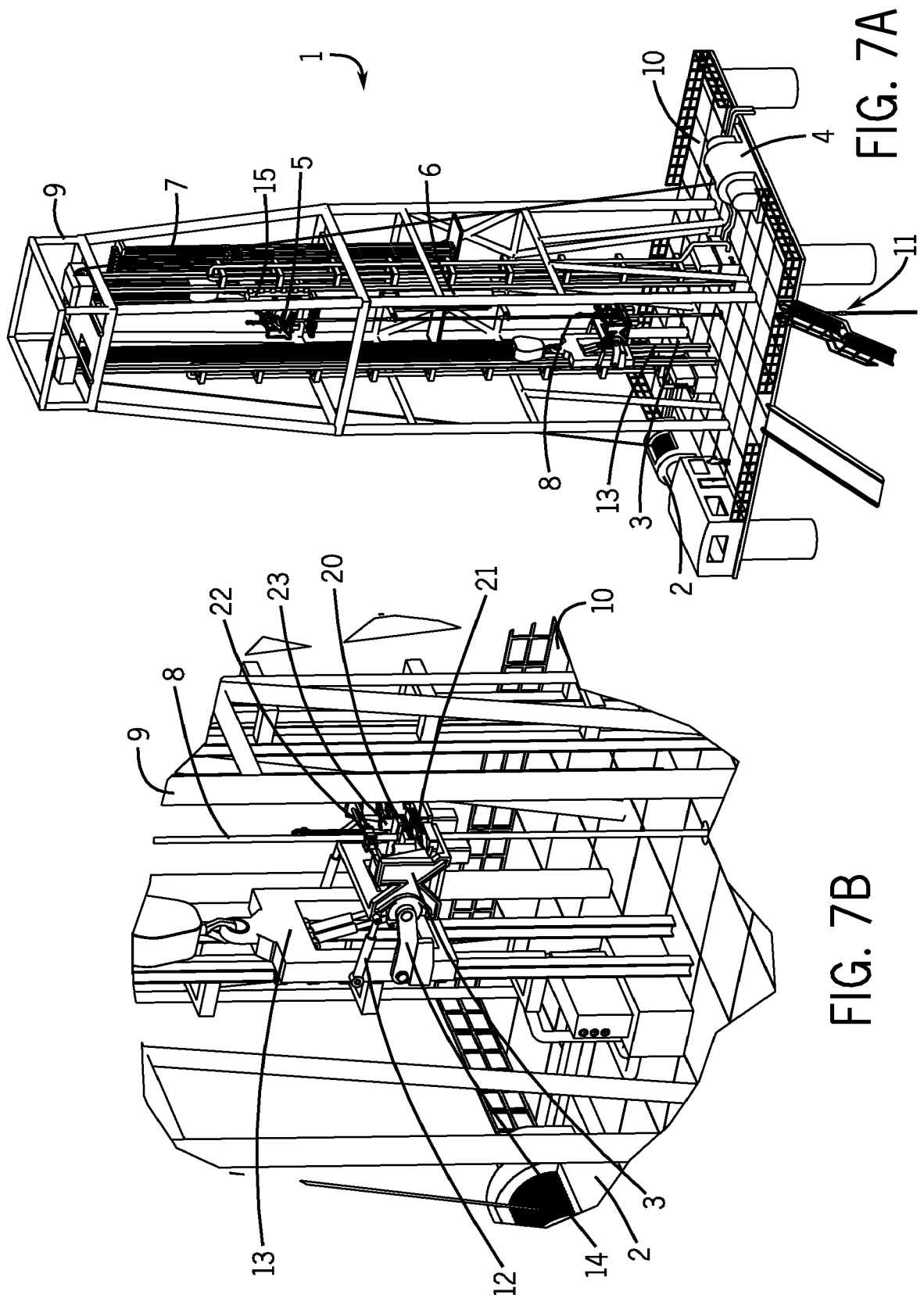


FIG. 5A

FIG. 5B





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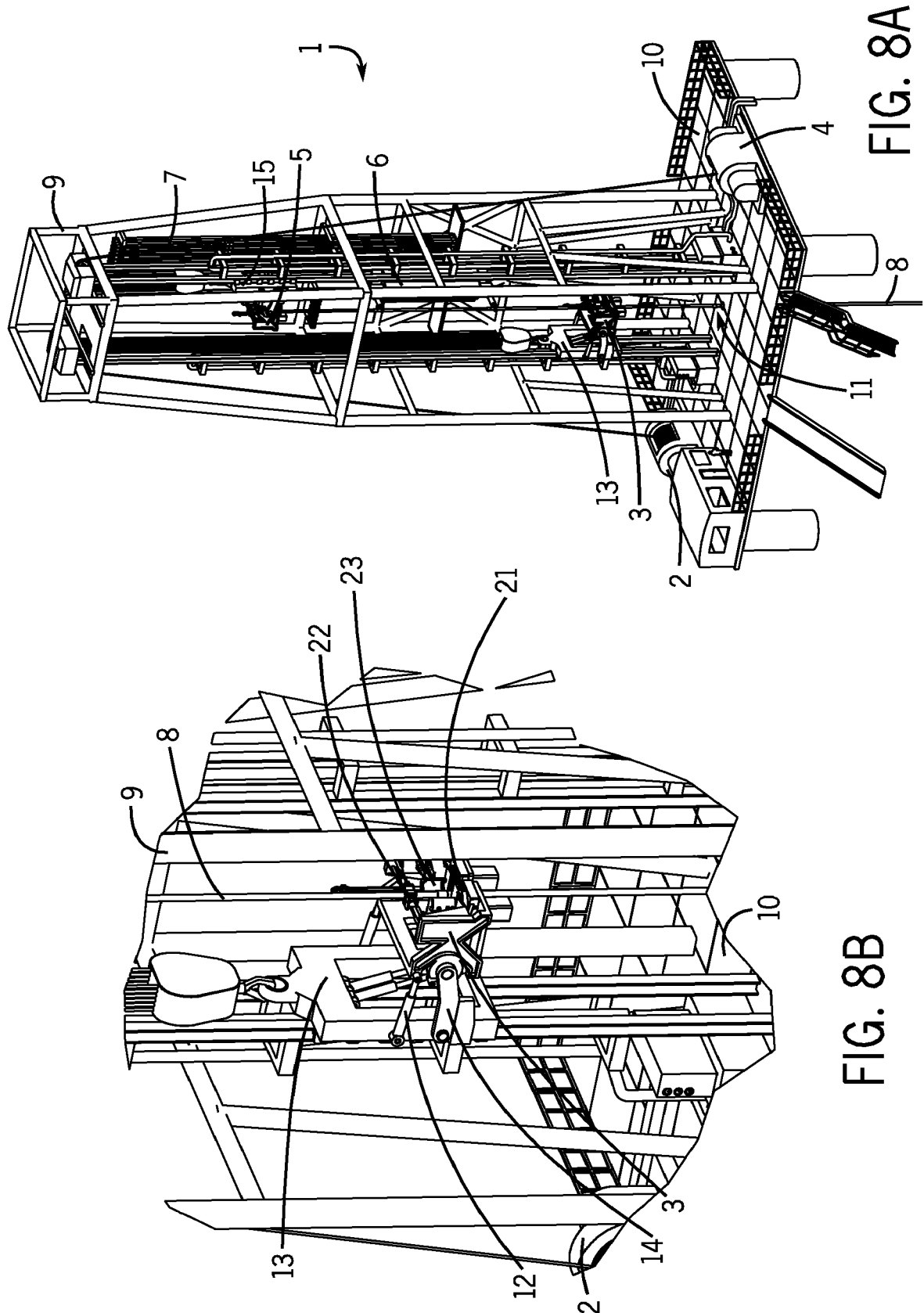


FIG. 8A

FIG. 8B

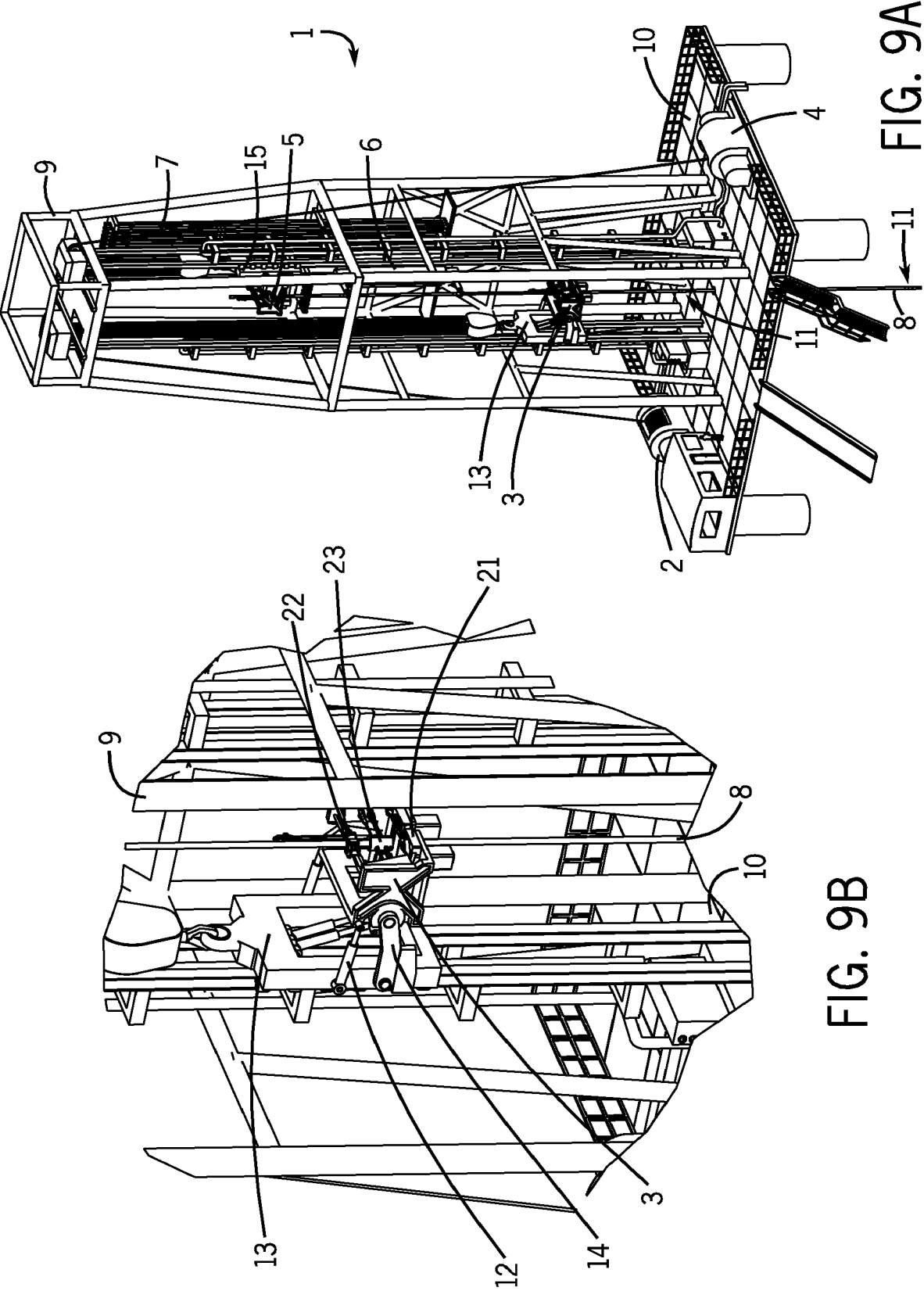
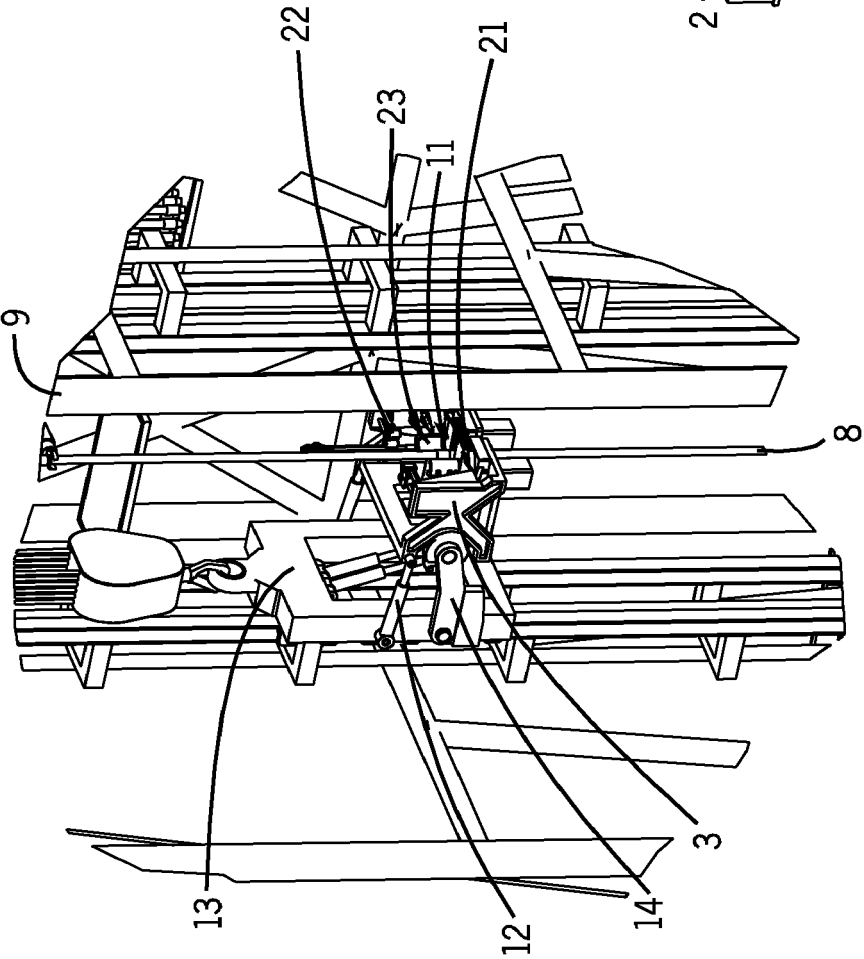
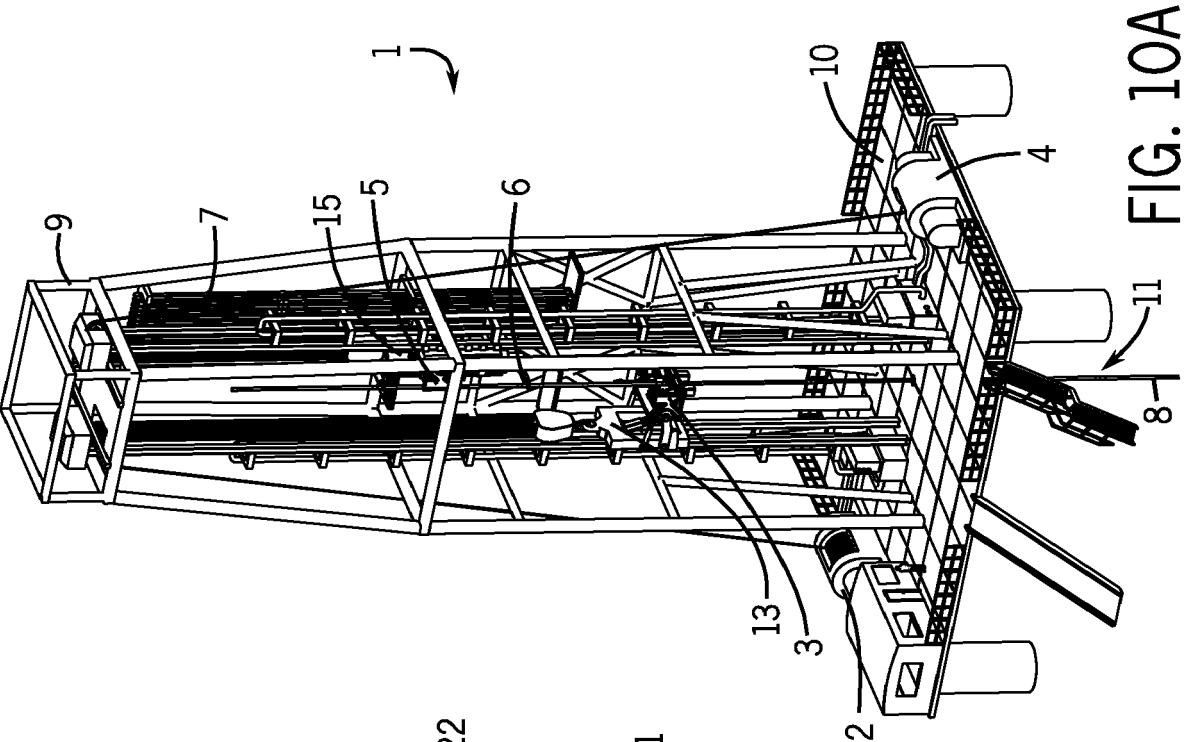


FIG. 9A

FIG. 9B



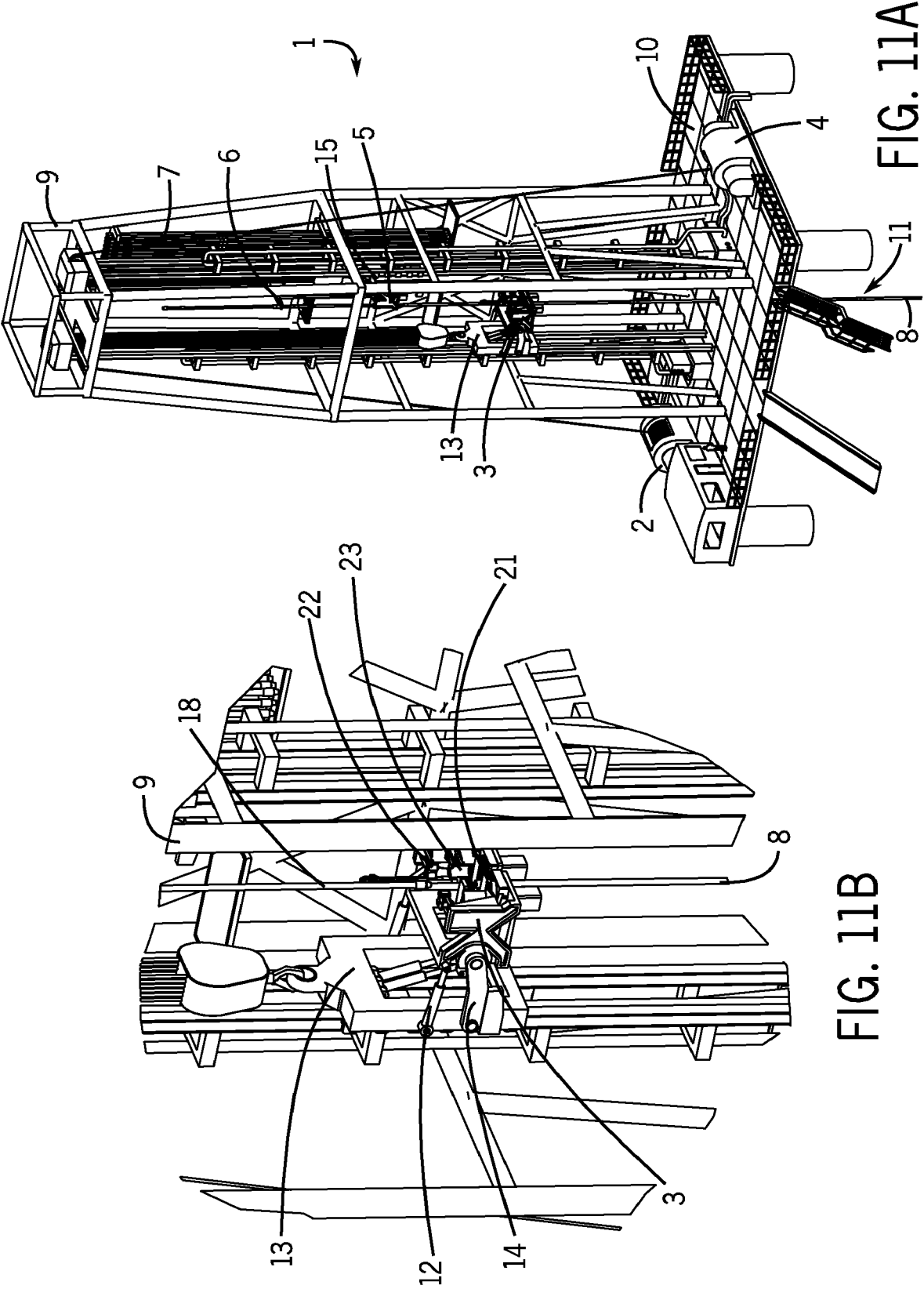


FIG. 11B

FIG. 11A

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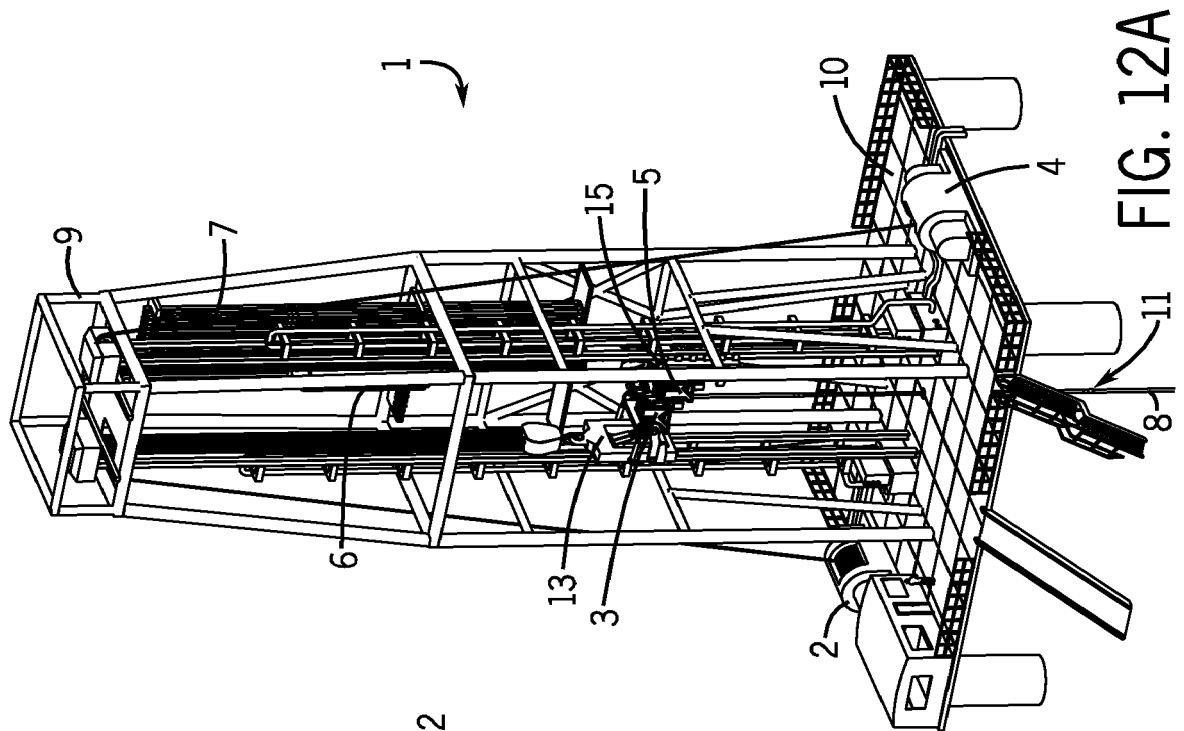


FIG. 12A

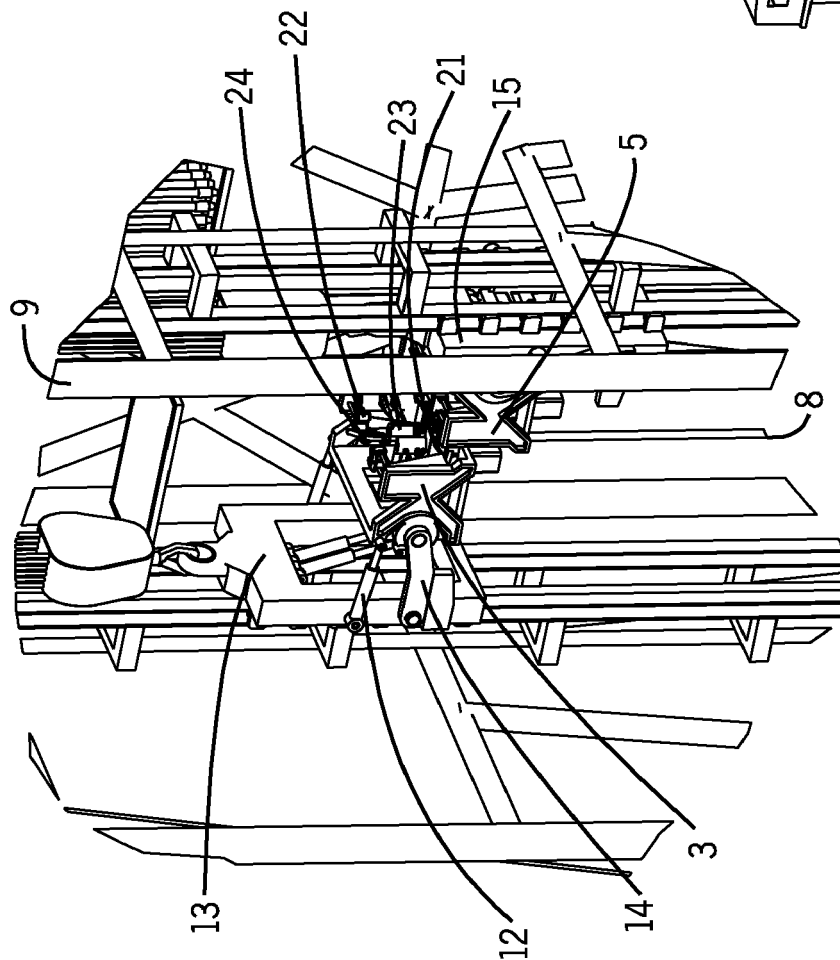


FIG. 12B

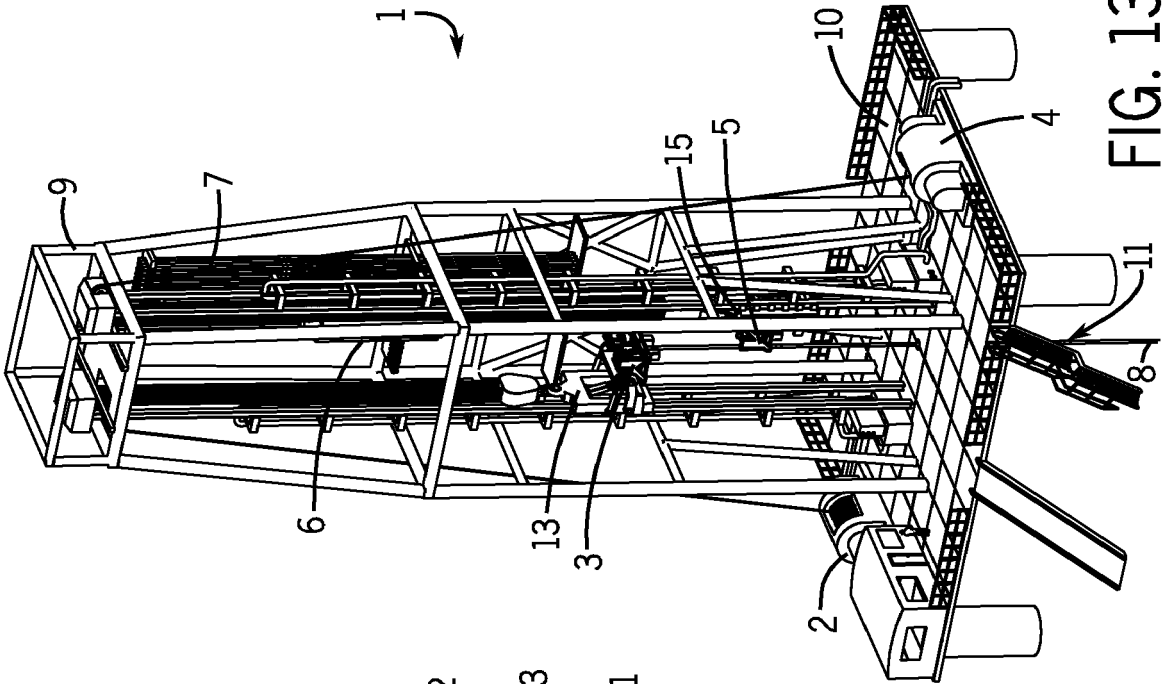


FIG. 13A

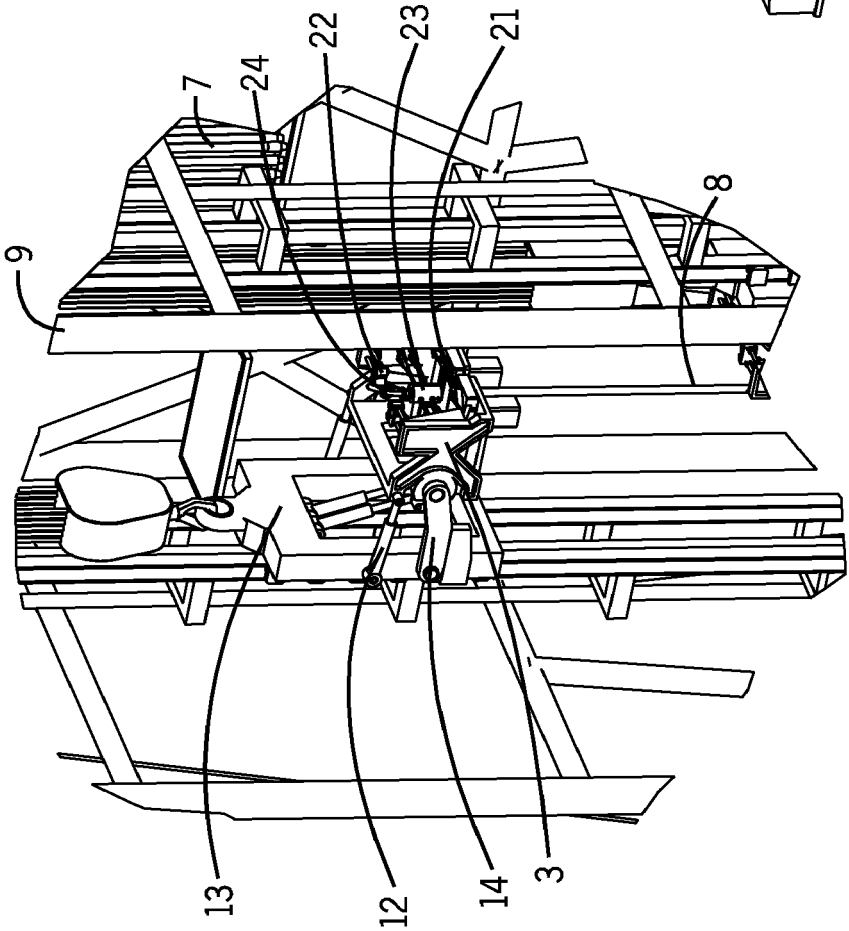


FIG. 13B

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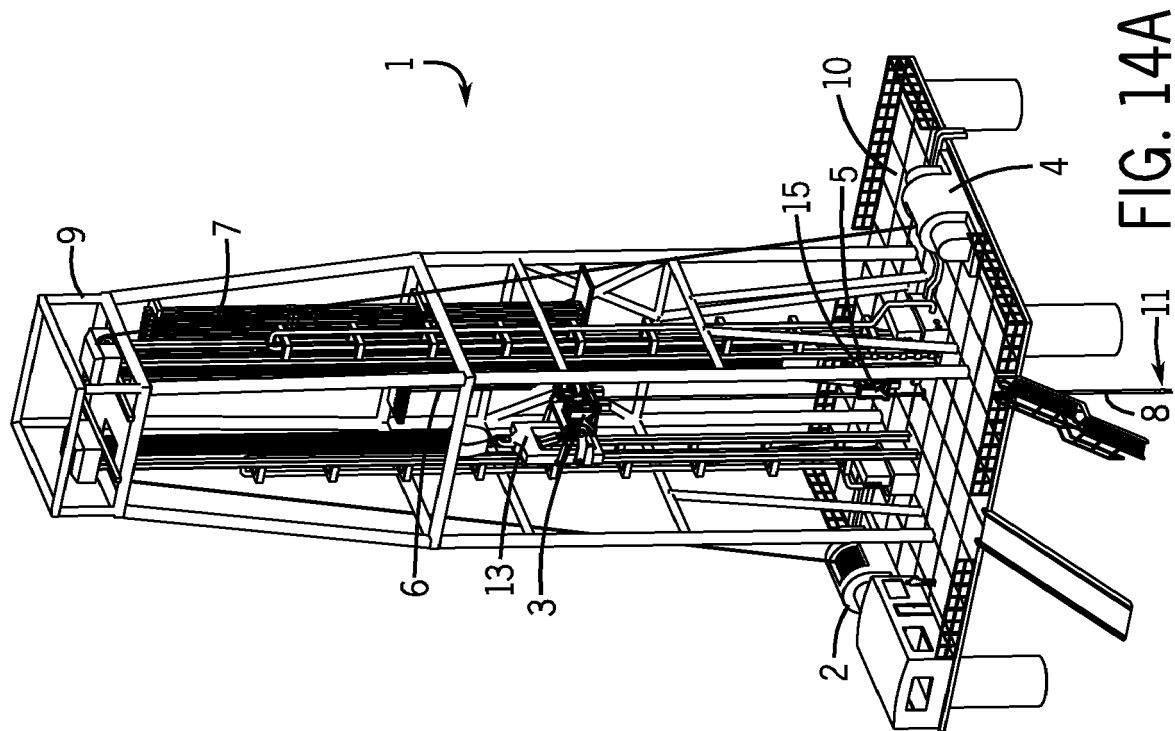


FIG. 14A

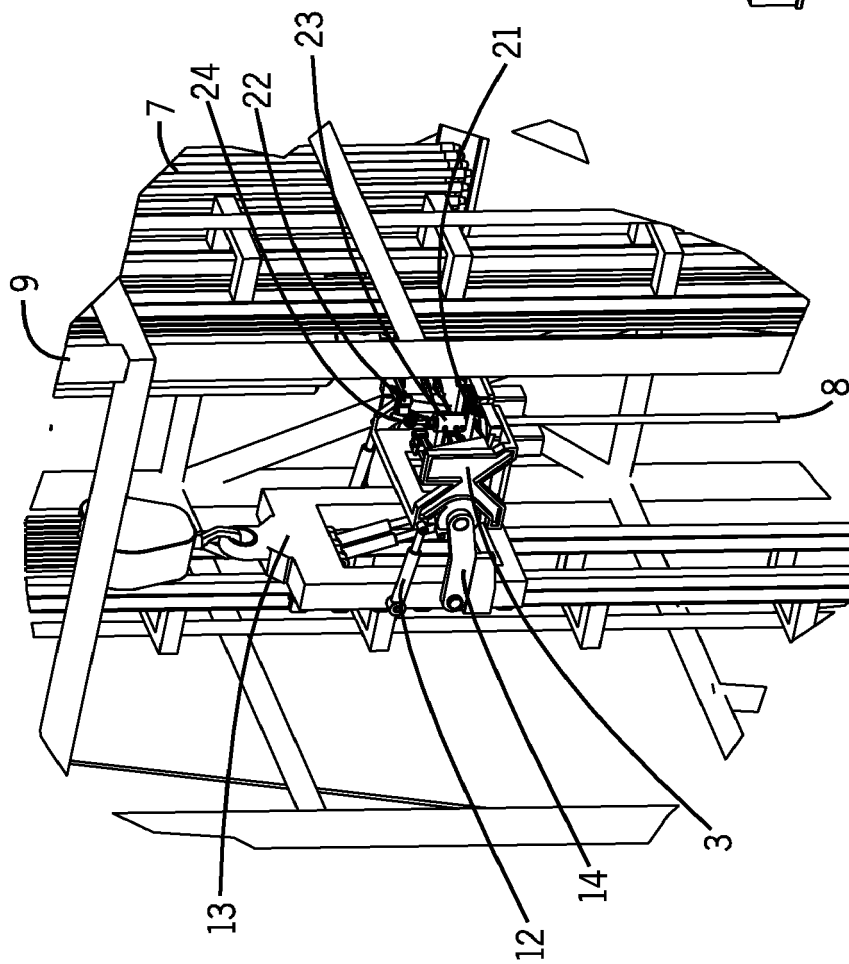
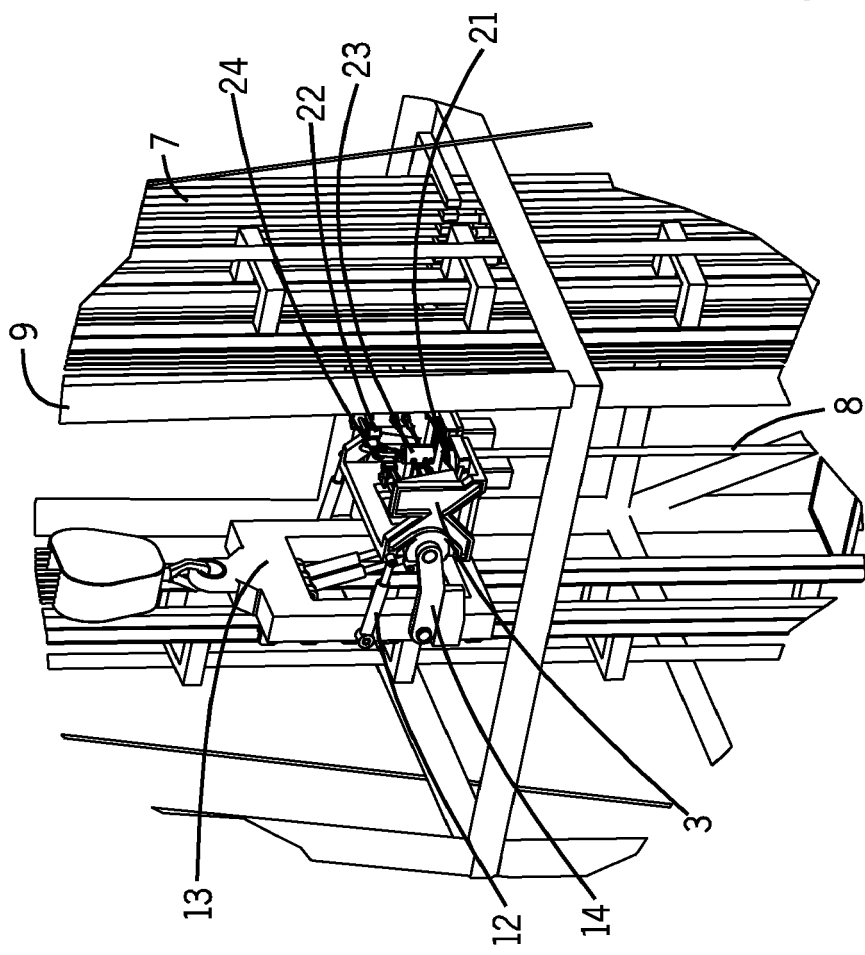
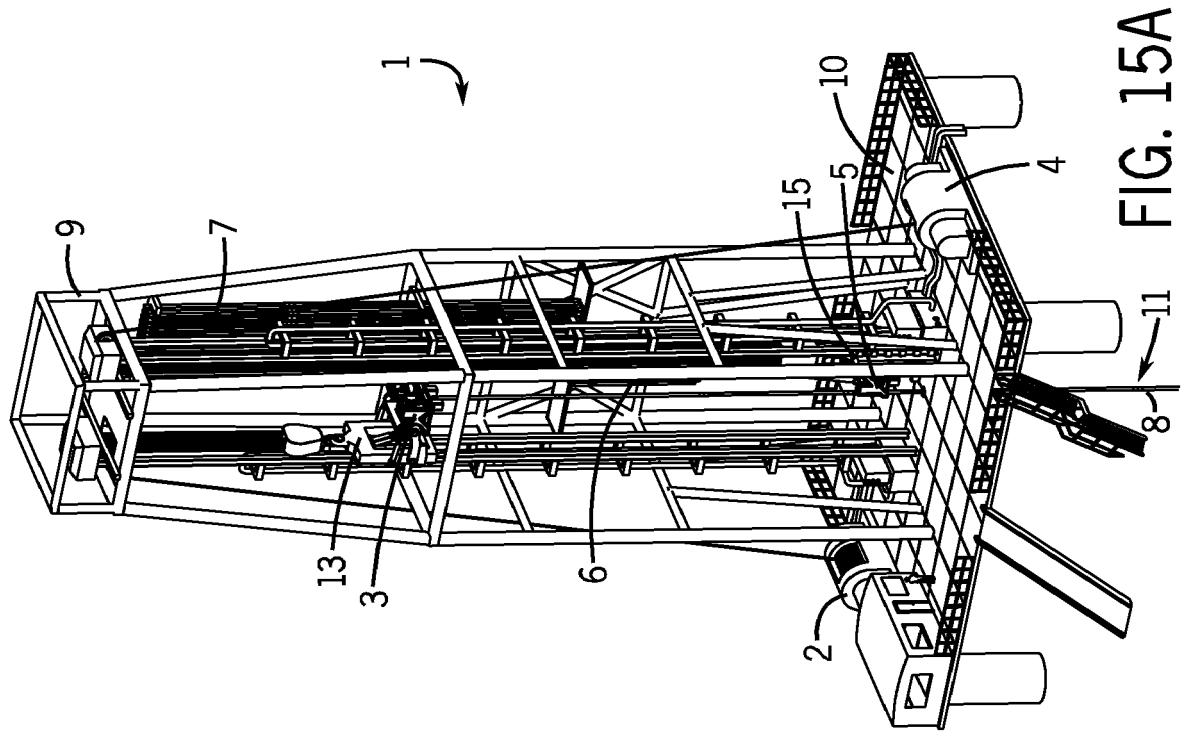
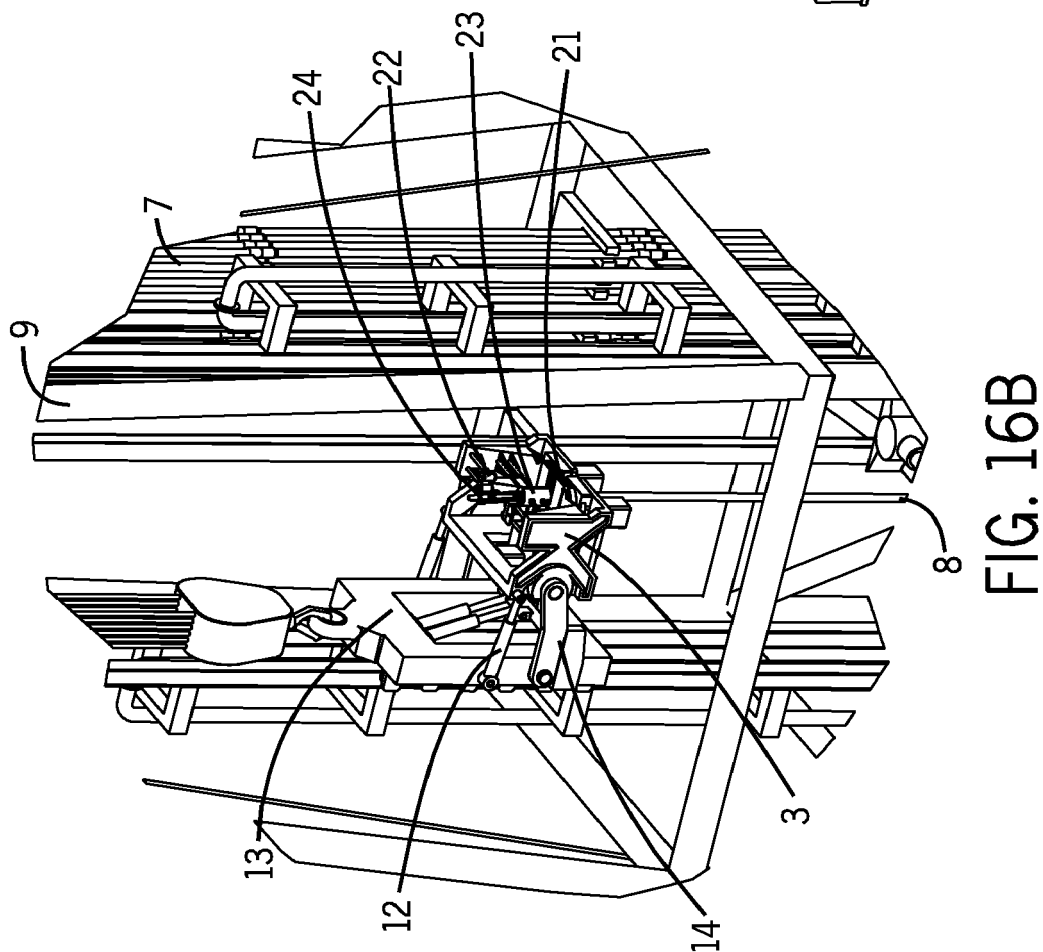
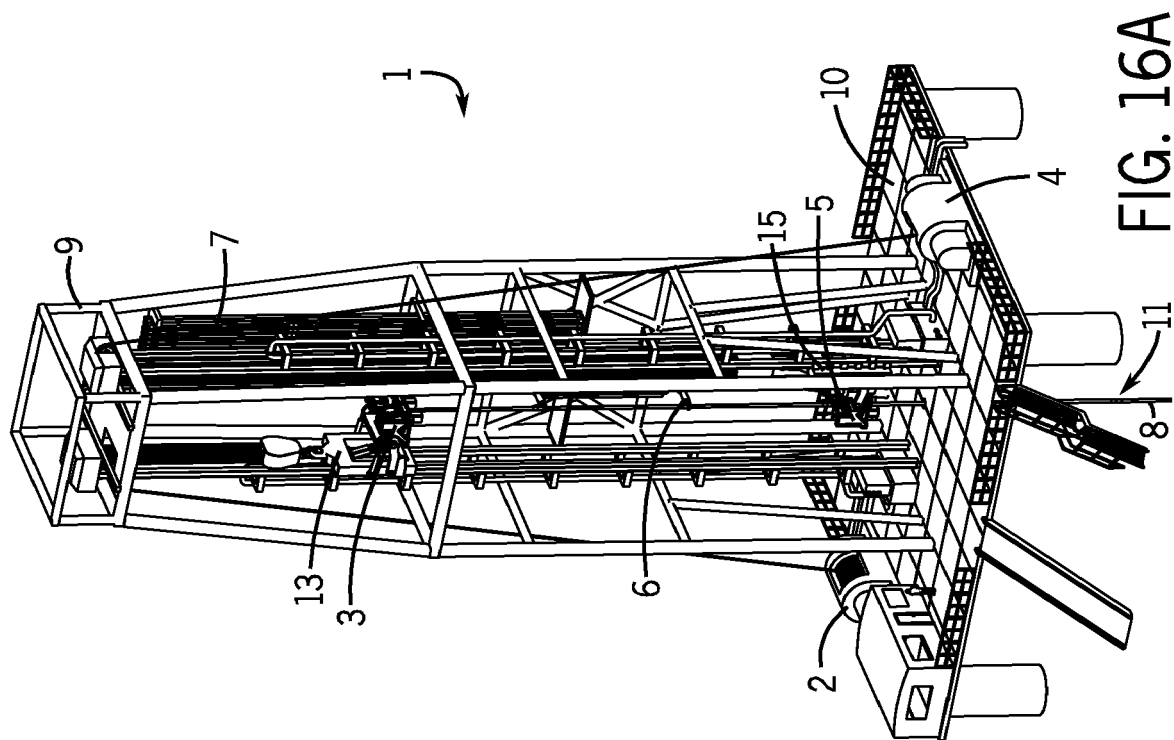


FIG. 14B



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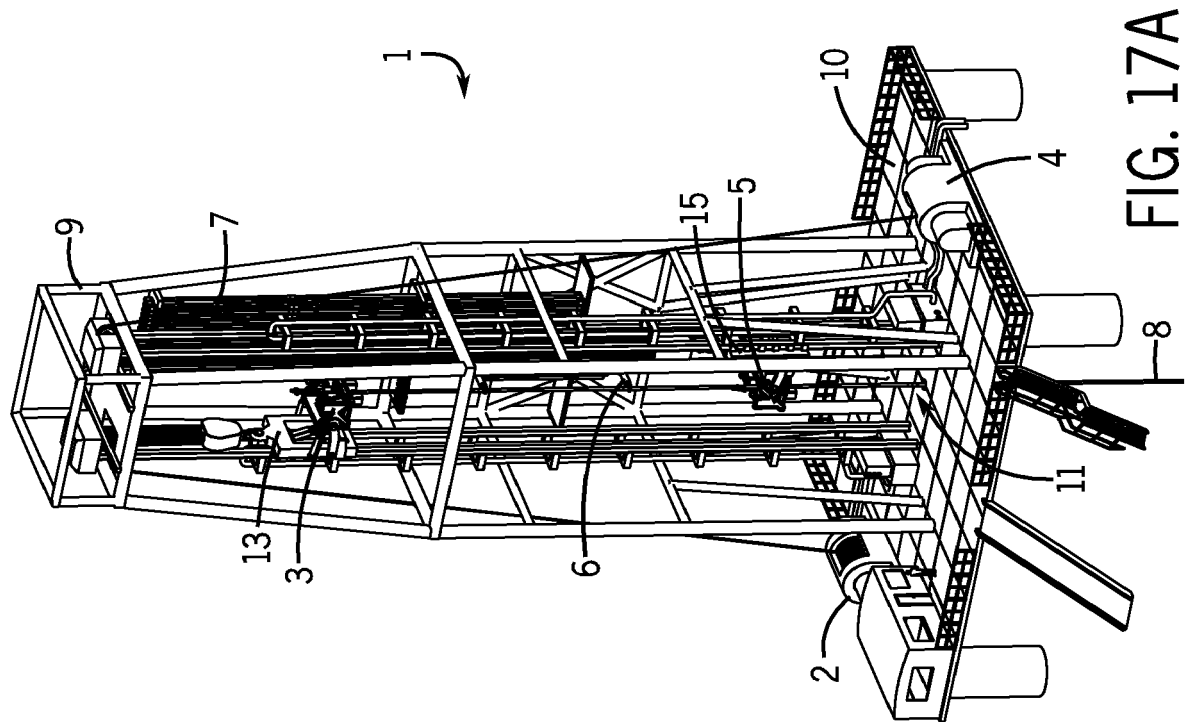


FIG. 17A

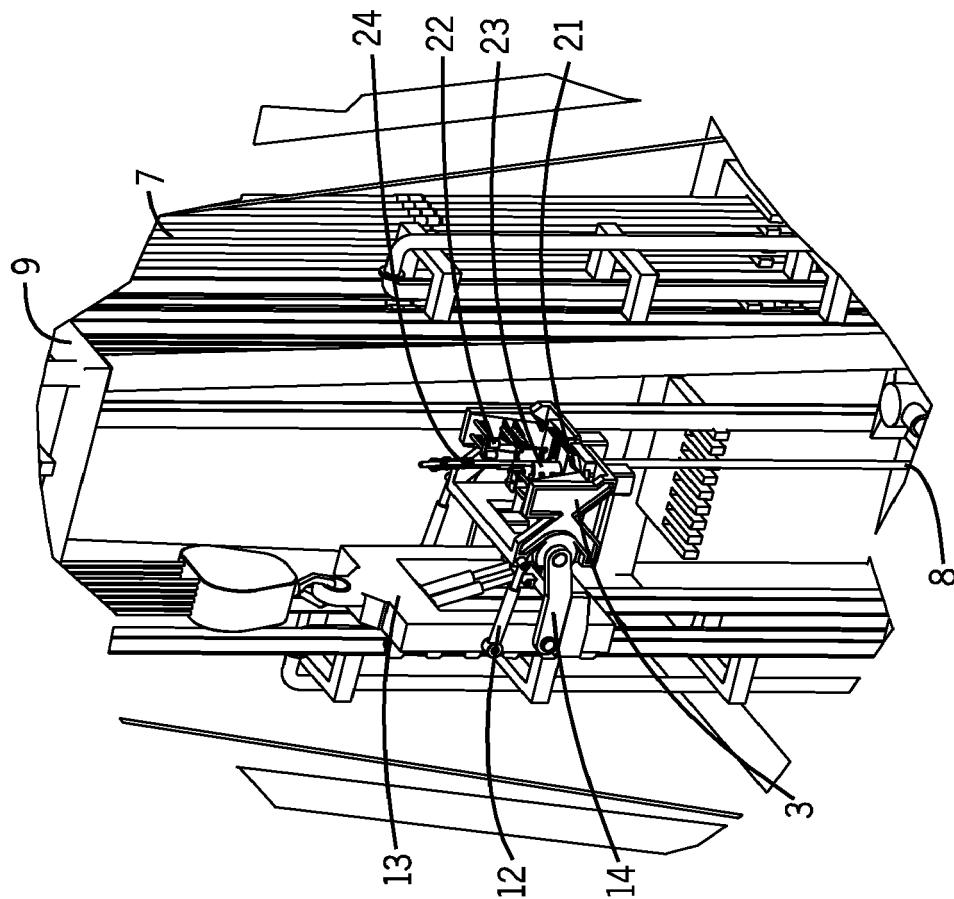


FIG. 17B

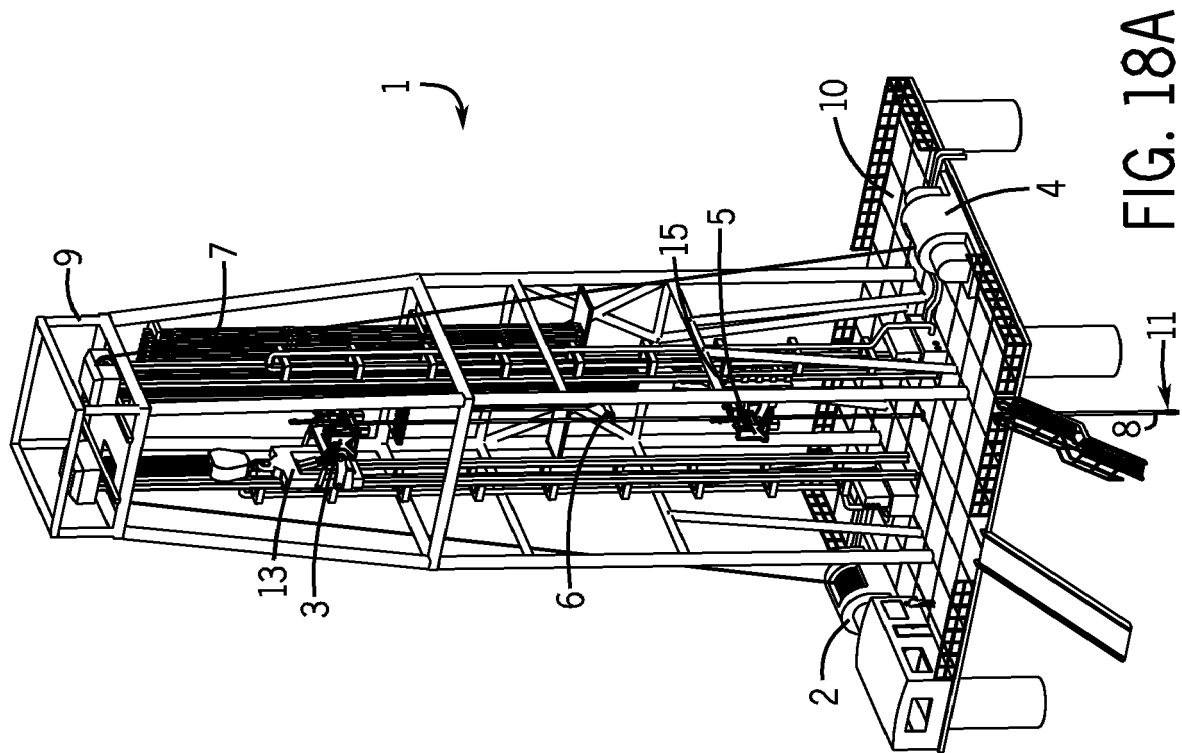


FIG. 18A

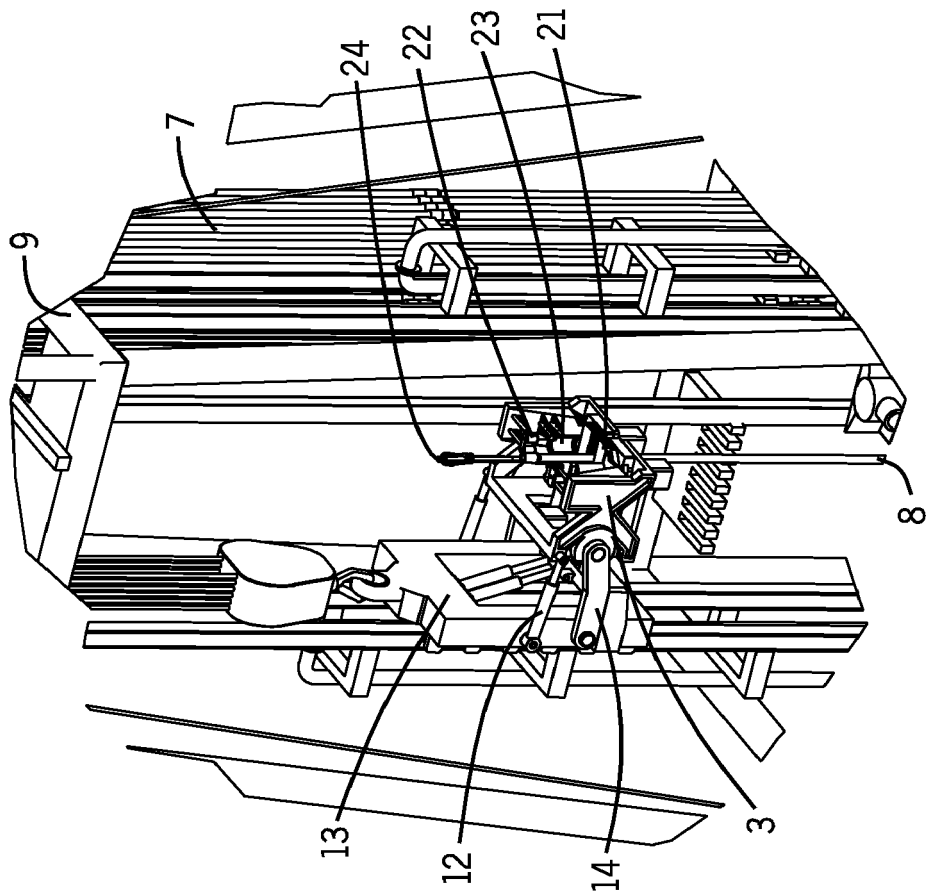


FIG. 18B

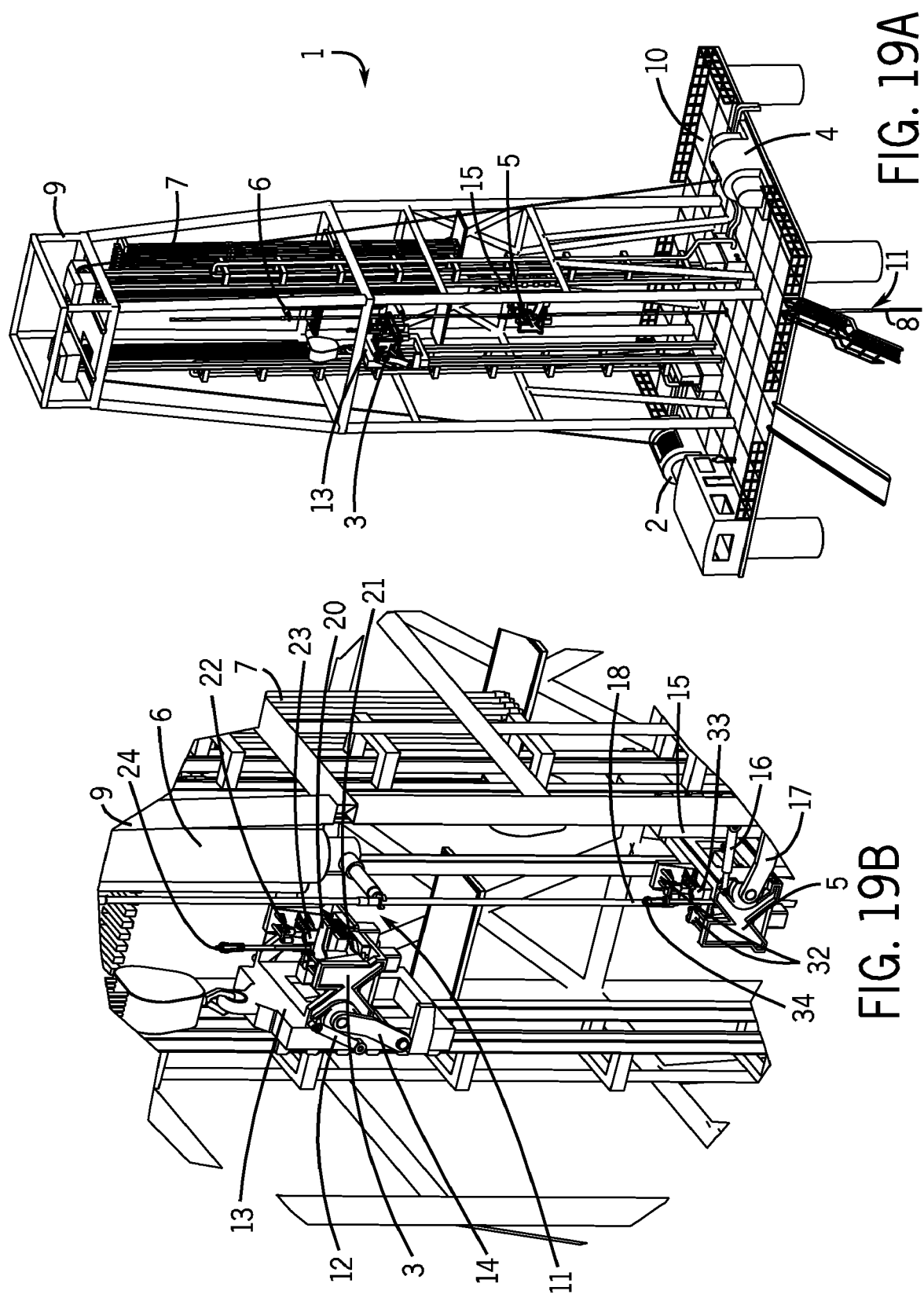


FIG. 19A

FIG. 19B

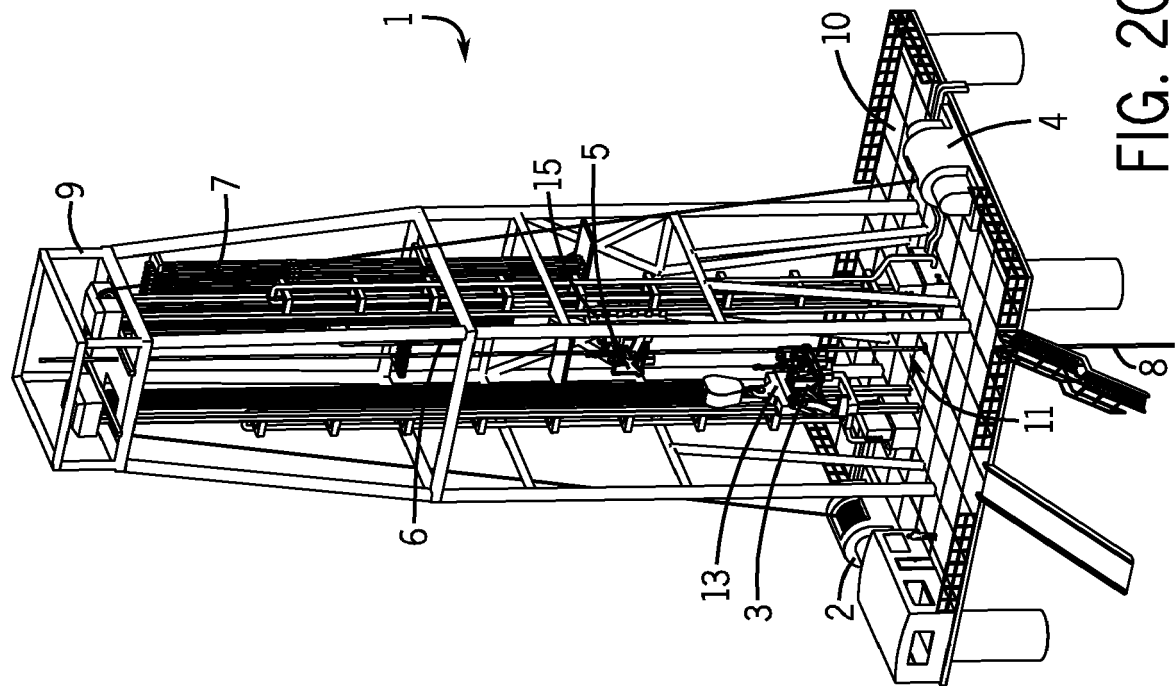


FIG. 20A

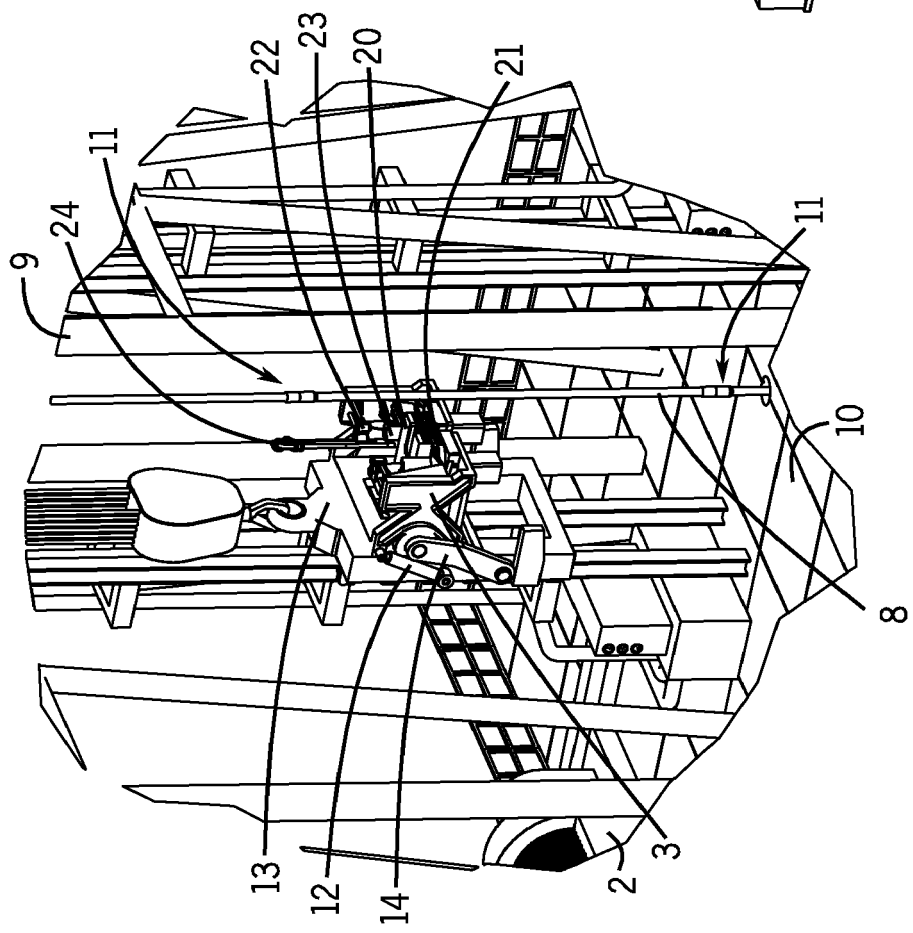


FIG. 20B

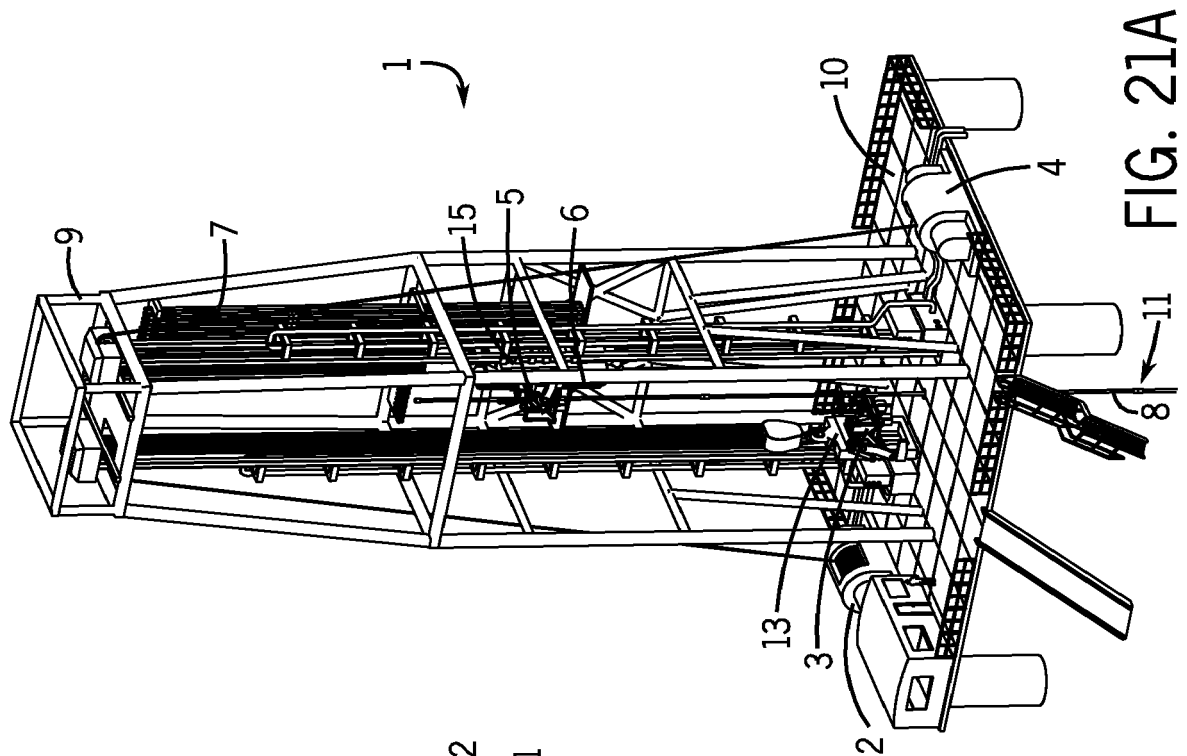


FIG. 21A

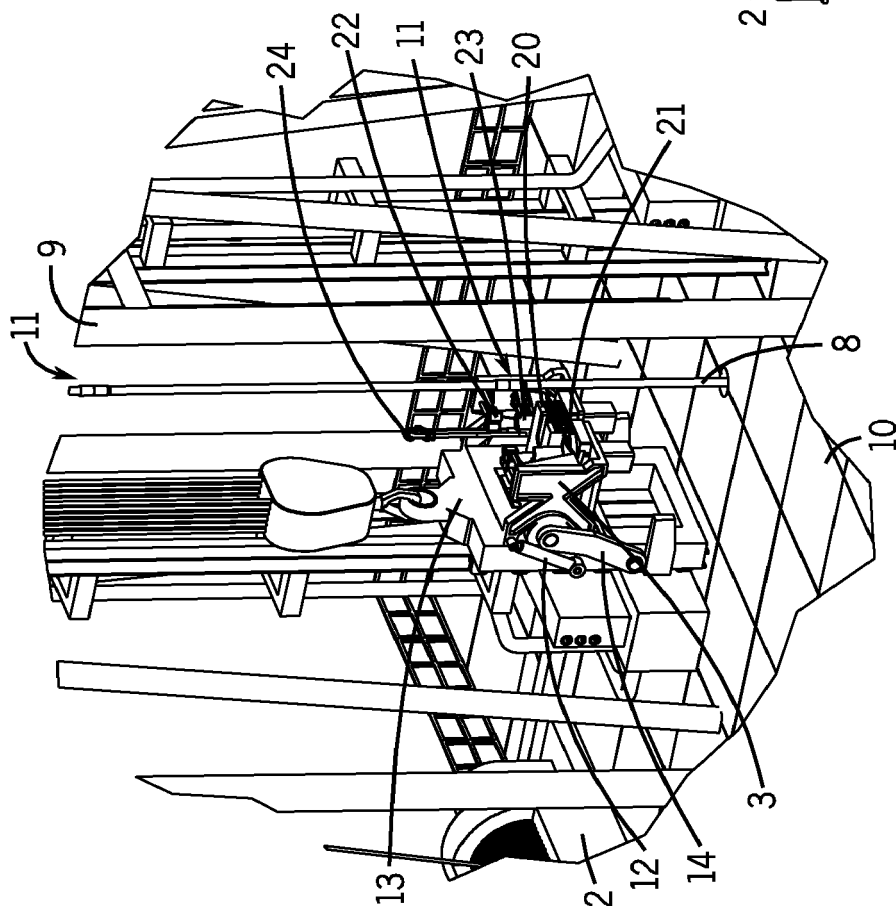
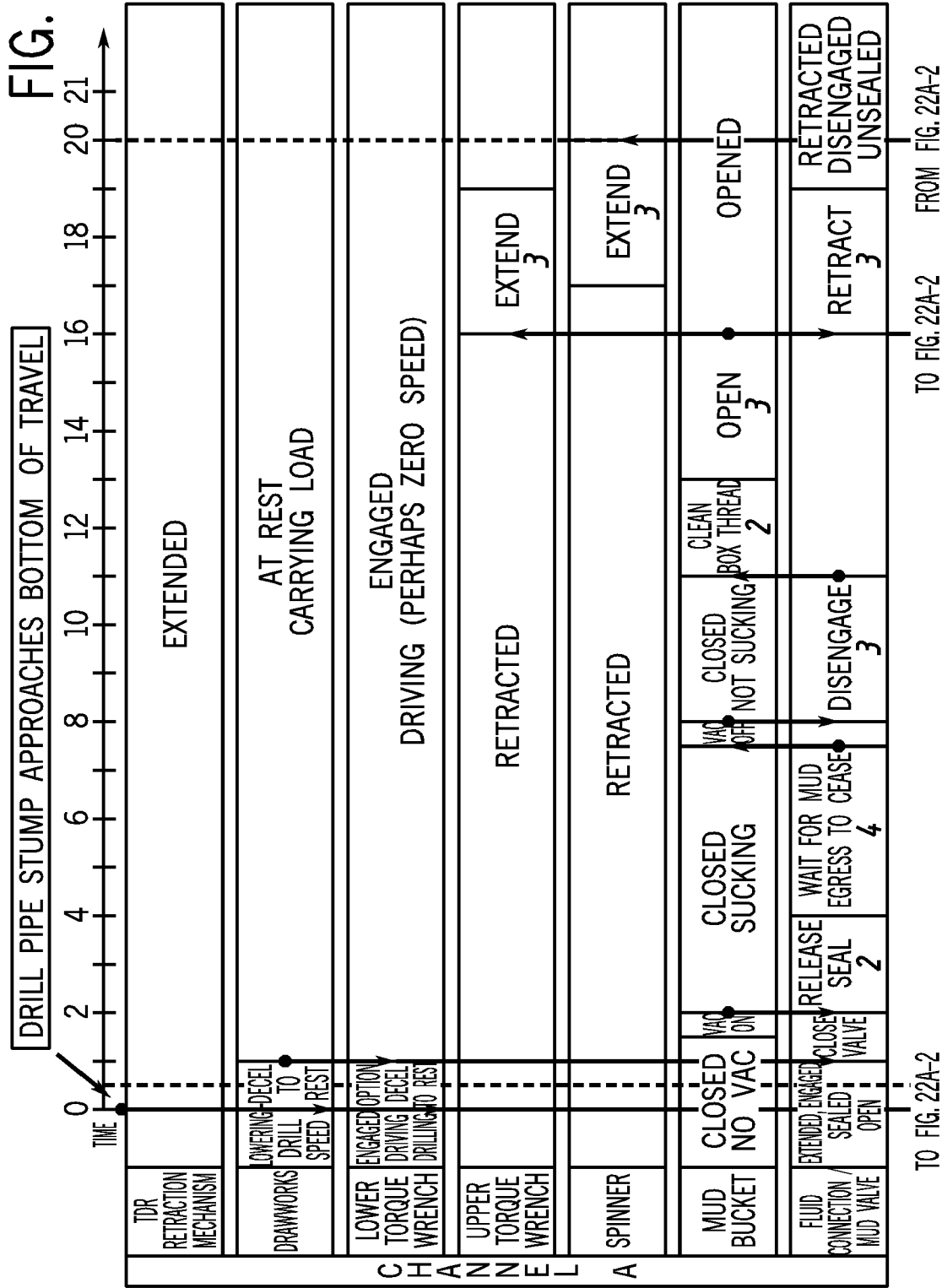


FIG. 21B

FIG. 22A-1



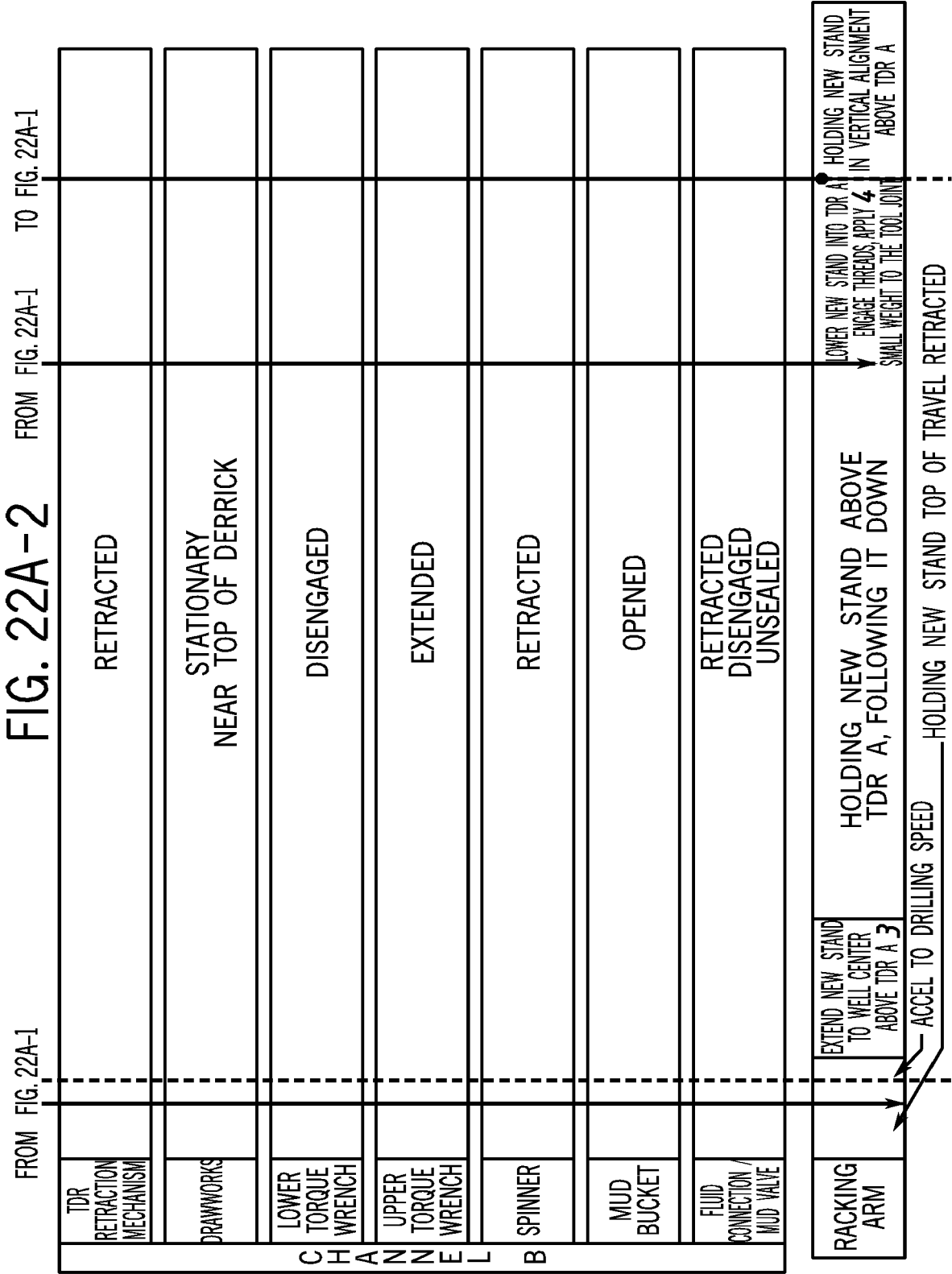
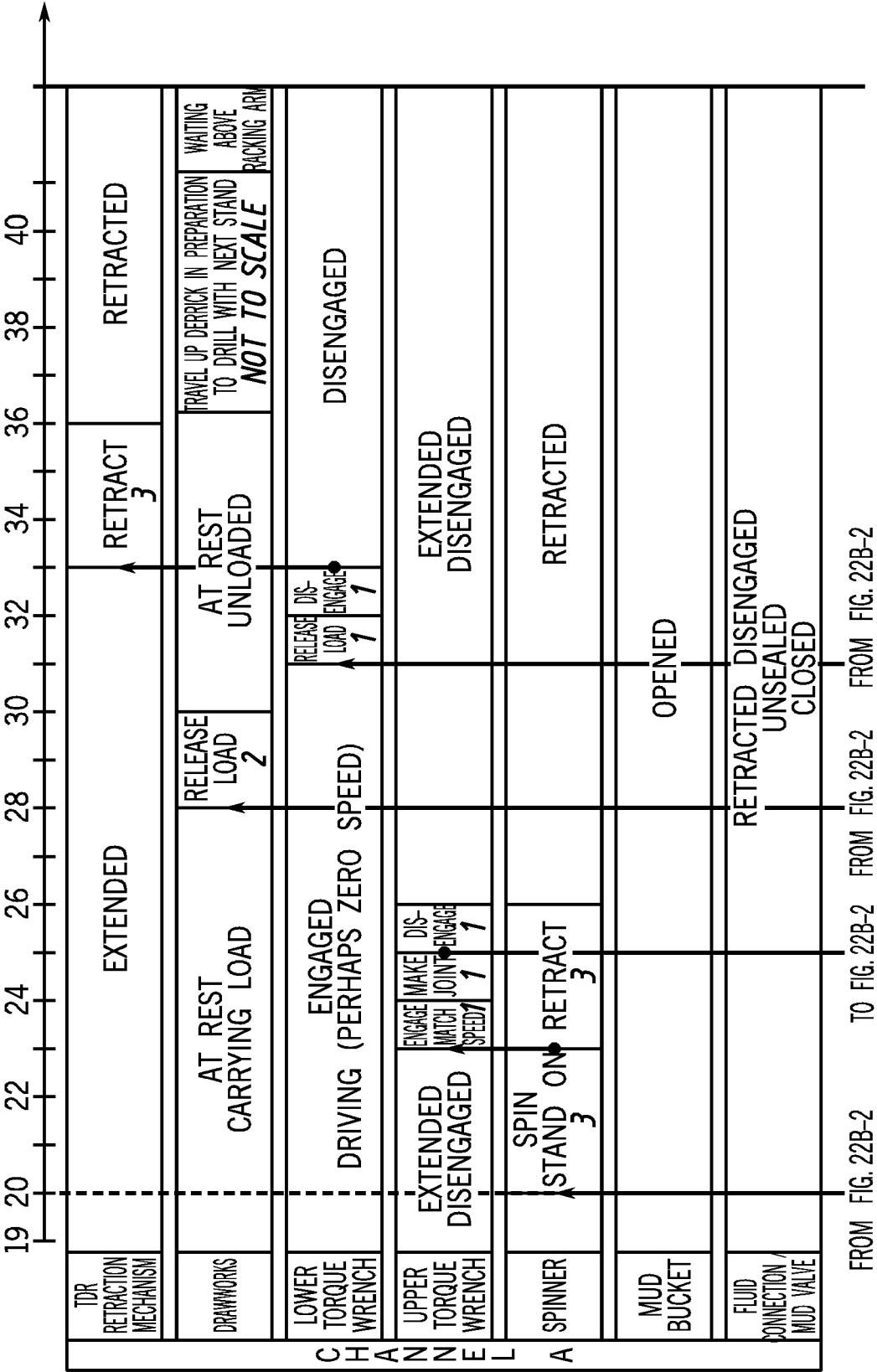


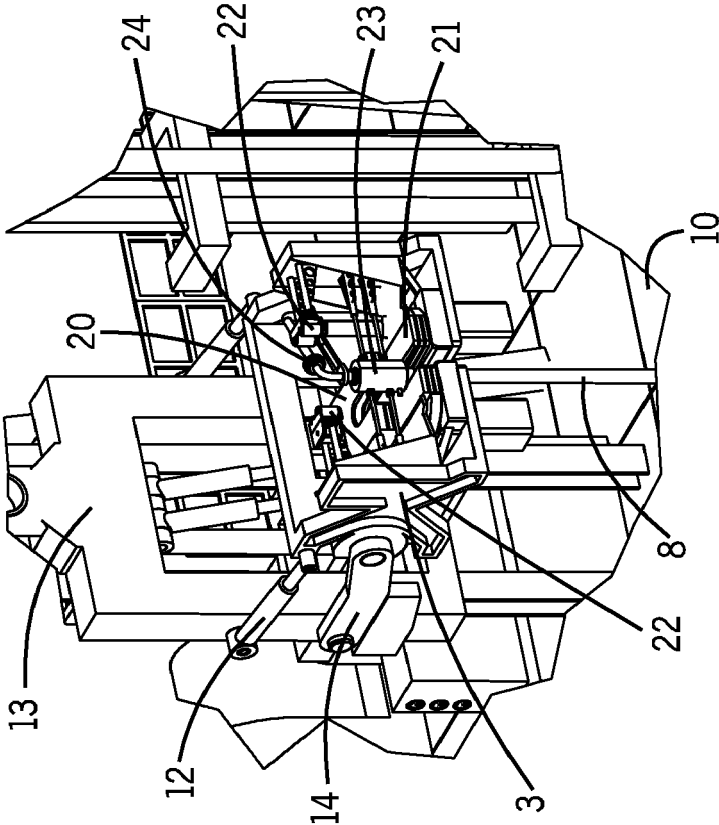
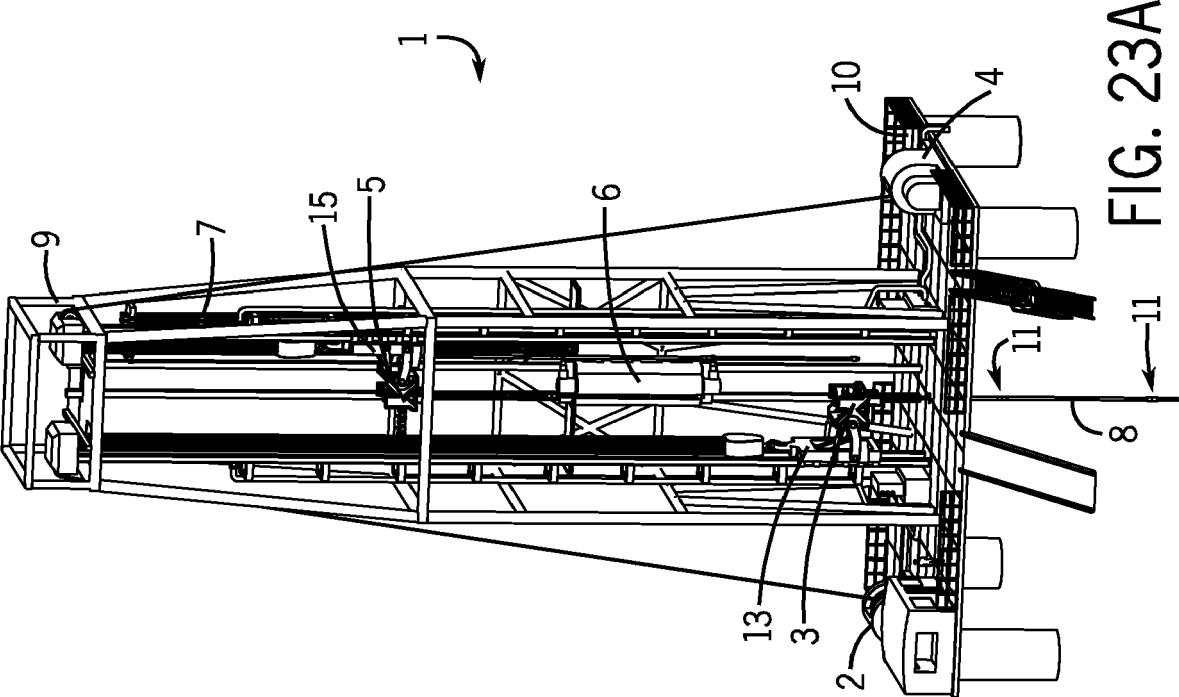
FIG. 22B-1

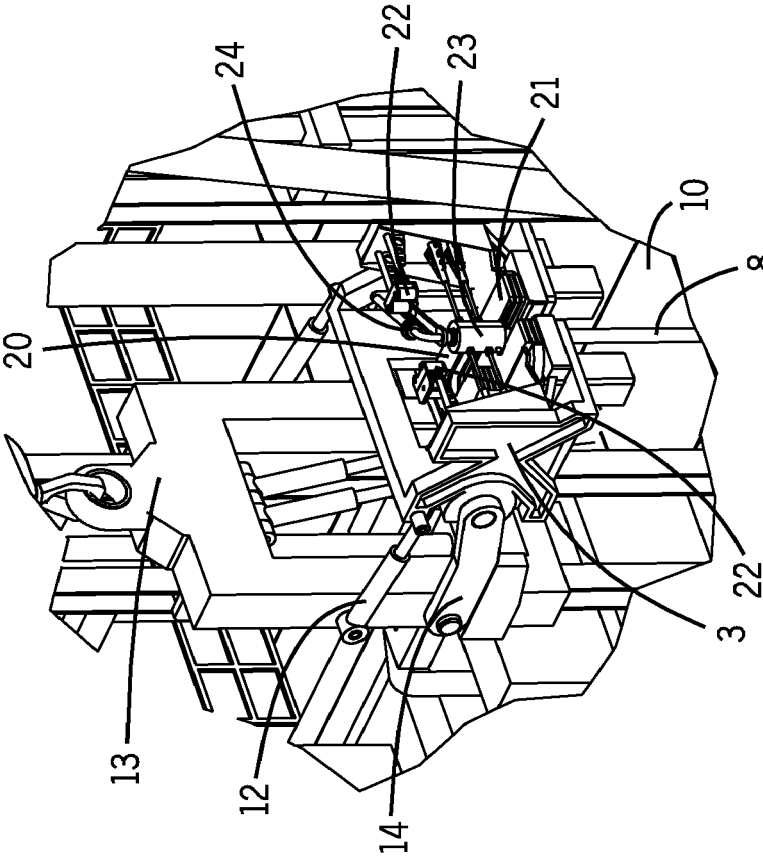
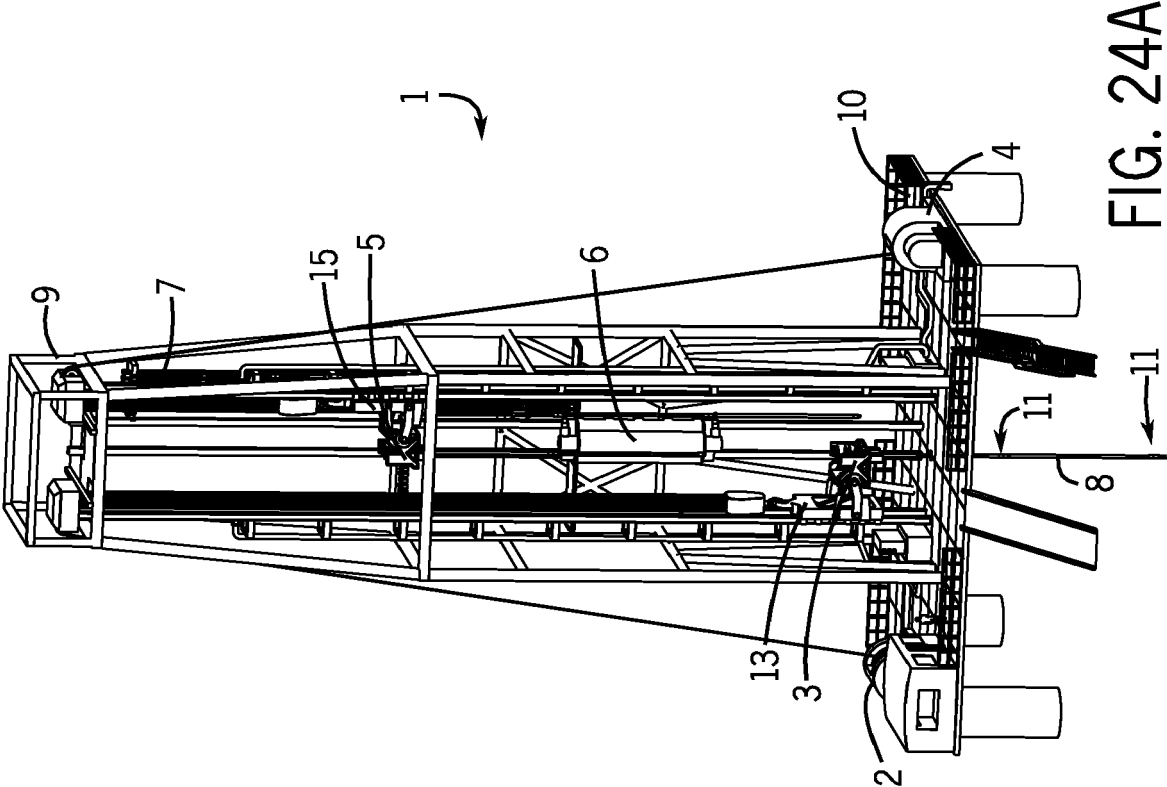


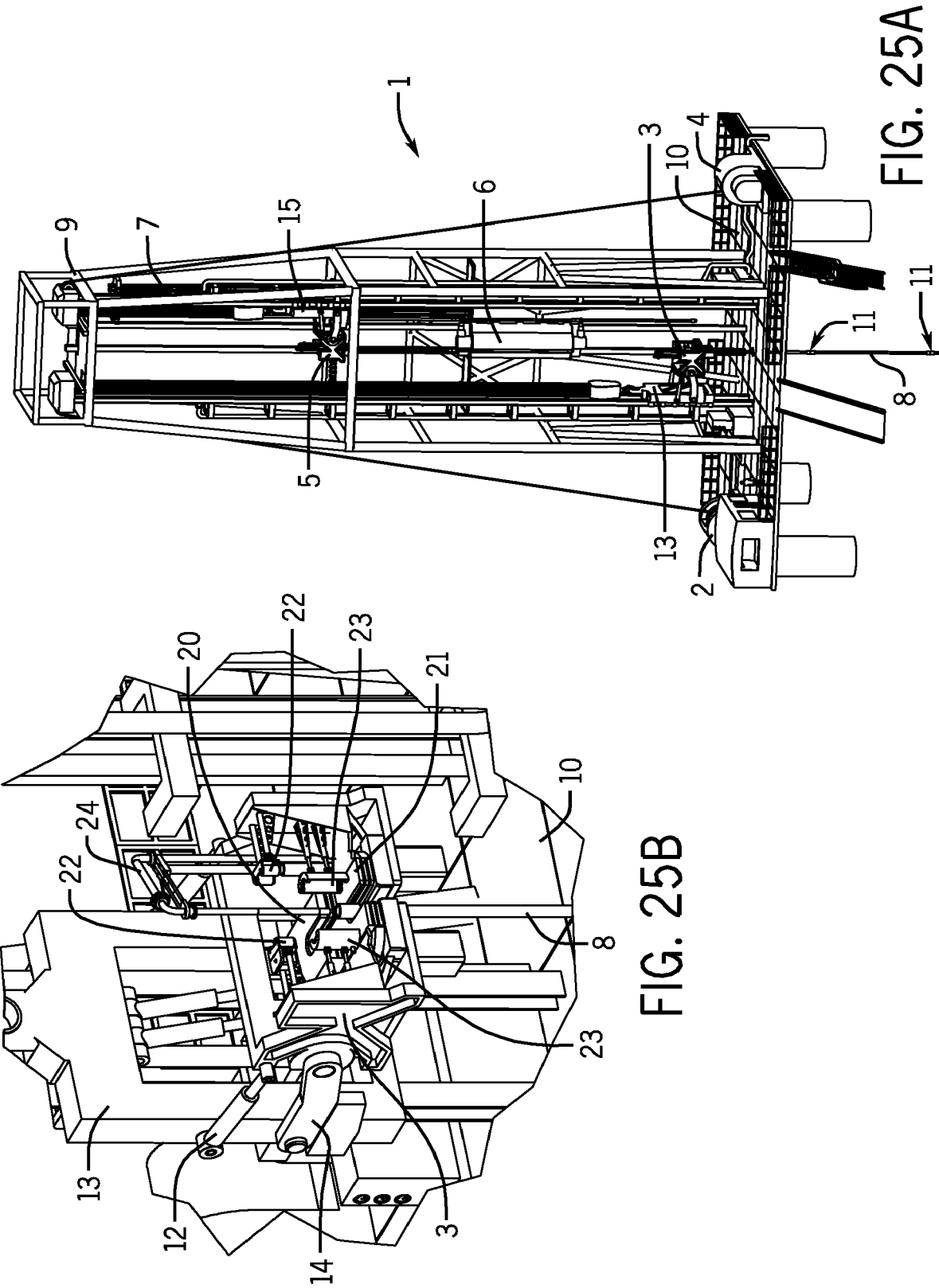
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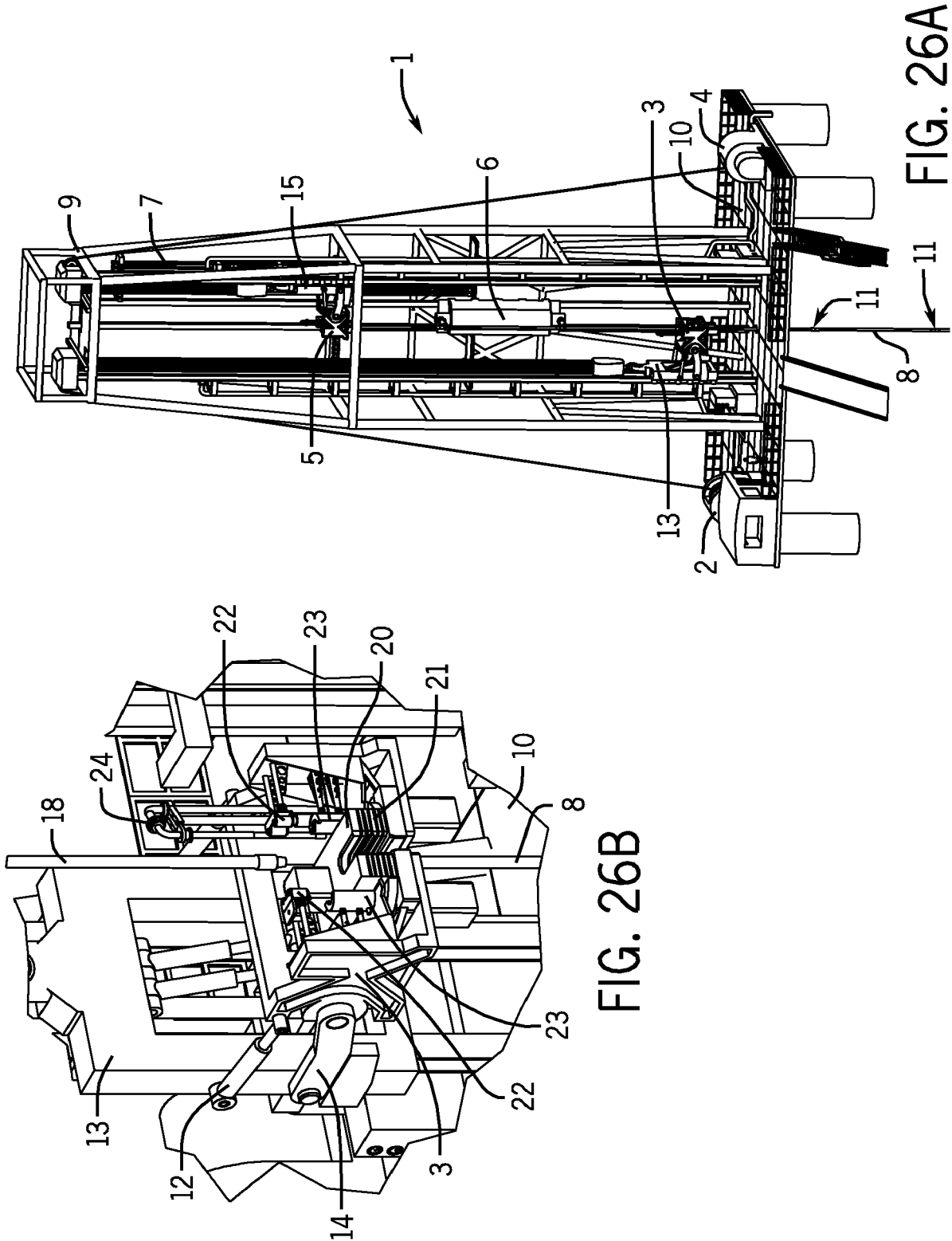
FIG. 22B-2

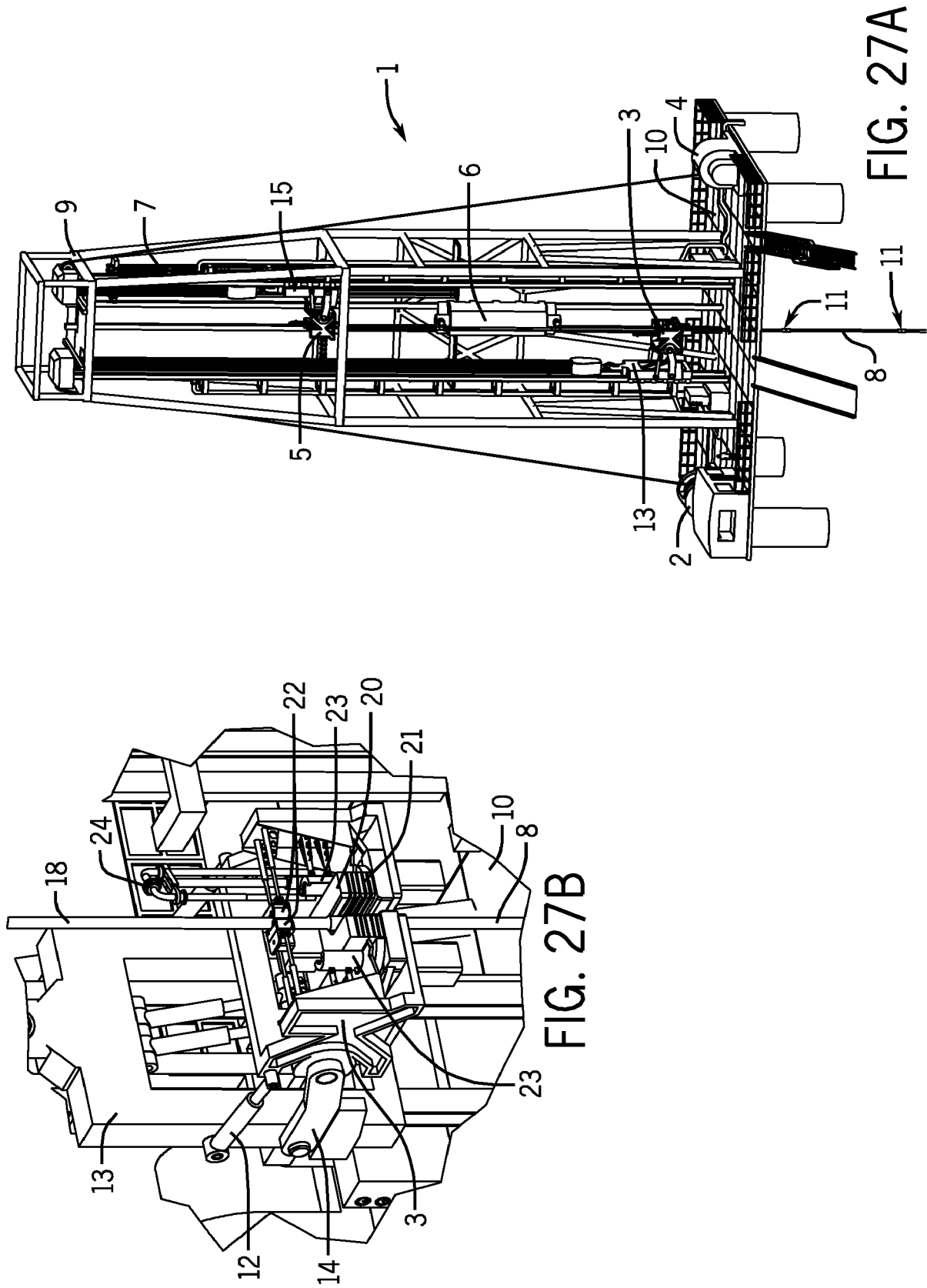
TO FIG. 22B-1		FROM FIG. 22B-1 TO FIG. 22B-1		TO FIG. 22B-1	
TDR RETRACTION MECHANISM	RETRACTED	EXTEND TO WELL CENTER 3	SMALL MOVE UP TO ASSUME LOAD 2	EXTENDED	
DRAWWORKS	STATIONARY NEAR TOP OF DERRICK			AT REST CARRYING LOAD	DRILLING SPEED 1
LOWER TORQUE WRENCH	DISENGAGED	ENGAGE MATCH SPEED 2	ASSUME LOAD 1	ENGAGED DRIVING (PERHAPS ZERO SPEED)	DRILLING SPEED 1
UPPER TORQUE WRENCH	EXTENDED	RETRACT 3		RETRACTED	
SPINNER		RETRACTED			
MUD BUCKET	OPENED			CLOSE 3	CLOSED NO VAC
FLUID CONNECTION / MUD VALVE	RETRACTED DISENGAGED UNSEALED CLOSED	EXTEND 3	ENGAGE 3	SEAL 3	EXTENDED, ENGAGED SEALED OPEN
RACKING ARM	HOLDING NEW STAND IN VERTICAL ALIGNMENT ABOVE TDR A	RETRACT NOT TO SCALE	PICK UP NEW STAND FROM RACK NOT TO SCALE	RAISE TO CYCLE START POINT (NEAR TOP OF TRAVEL) NOT TO SCALE	HOLDING NEW STAND TOP OF TRAVEL RETRACTED











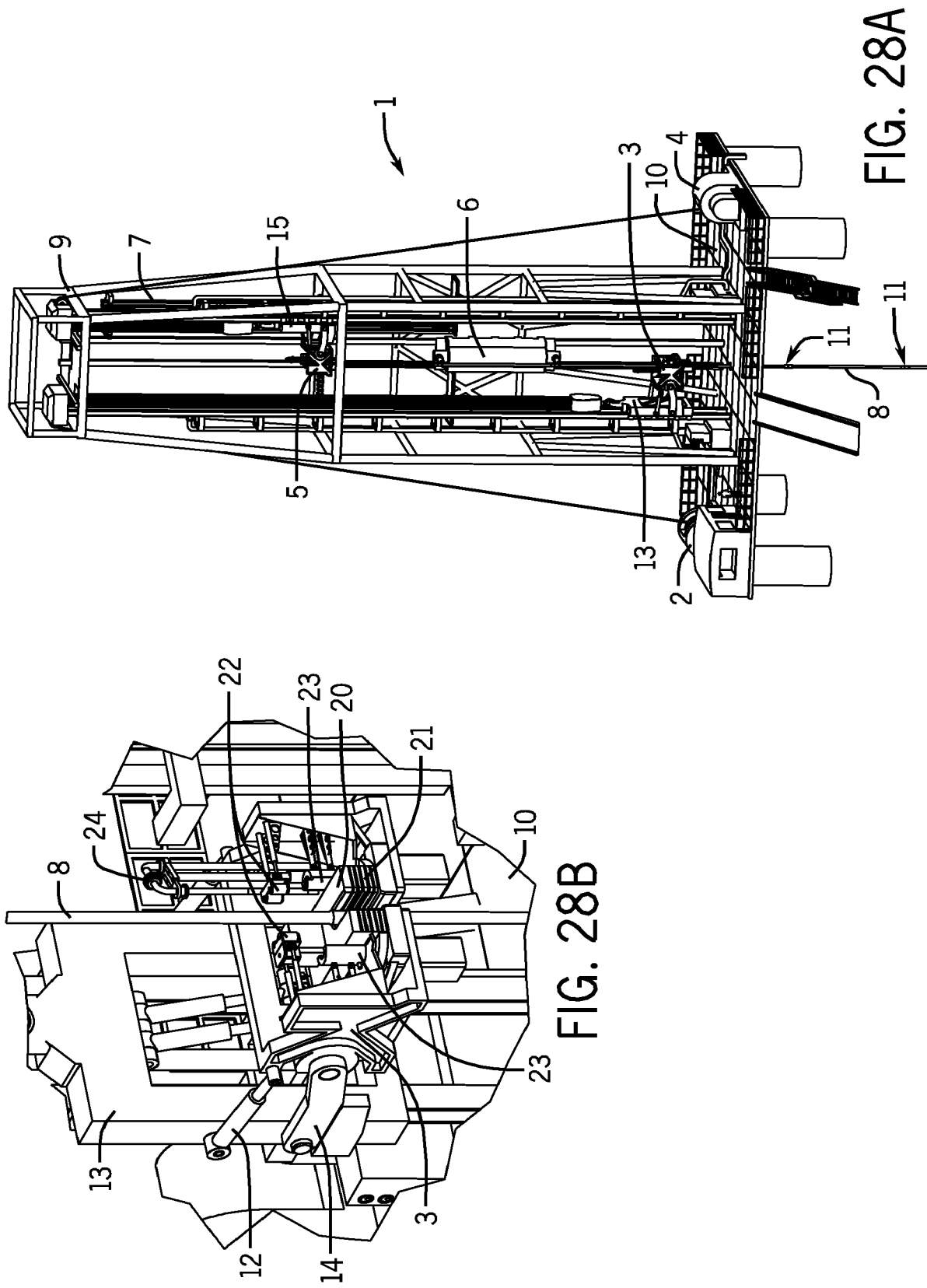
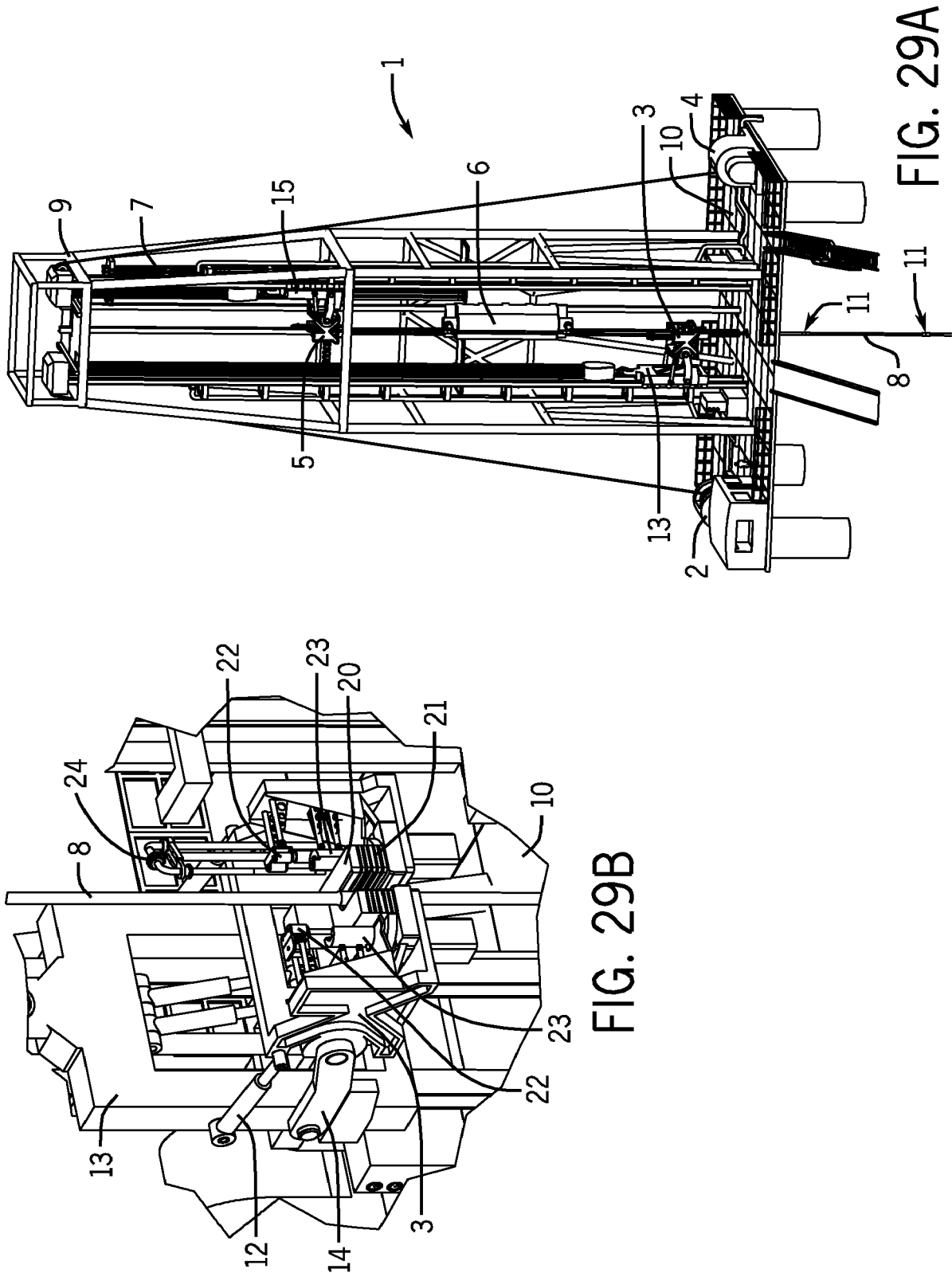


FIG. 28A

FIG. 28B



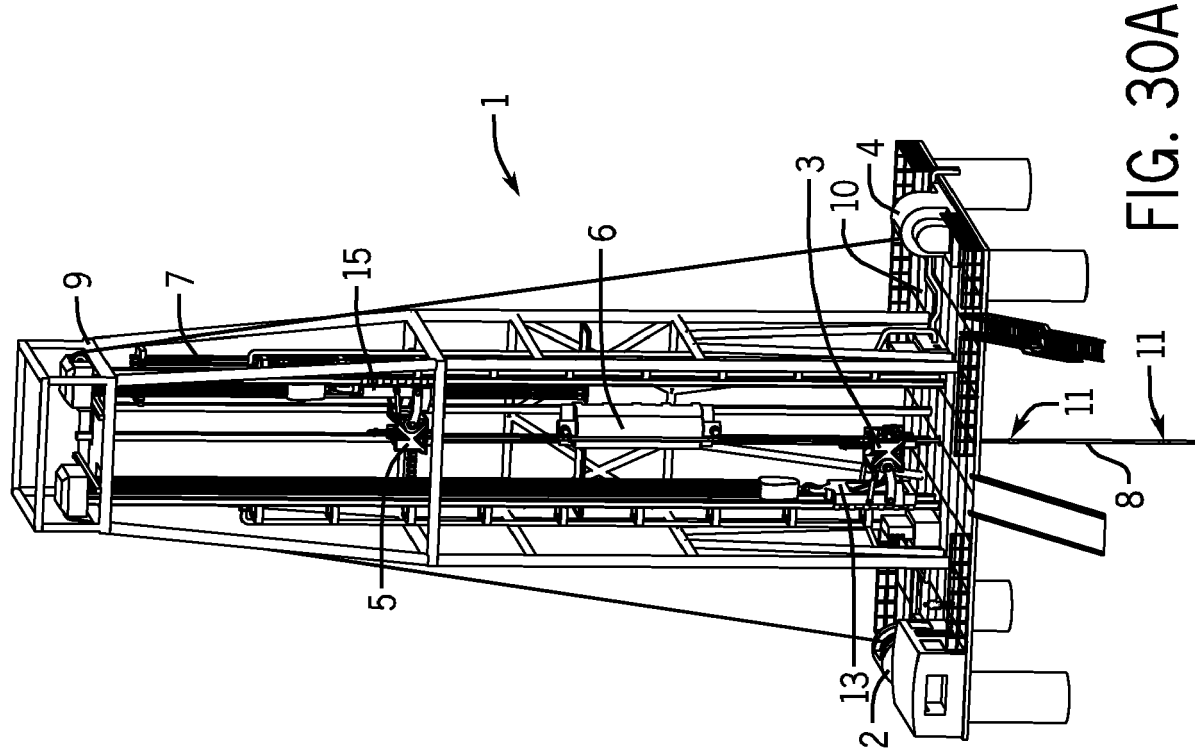


FIG. 30A

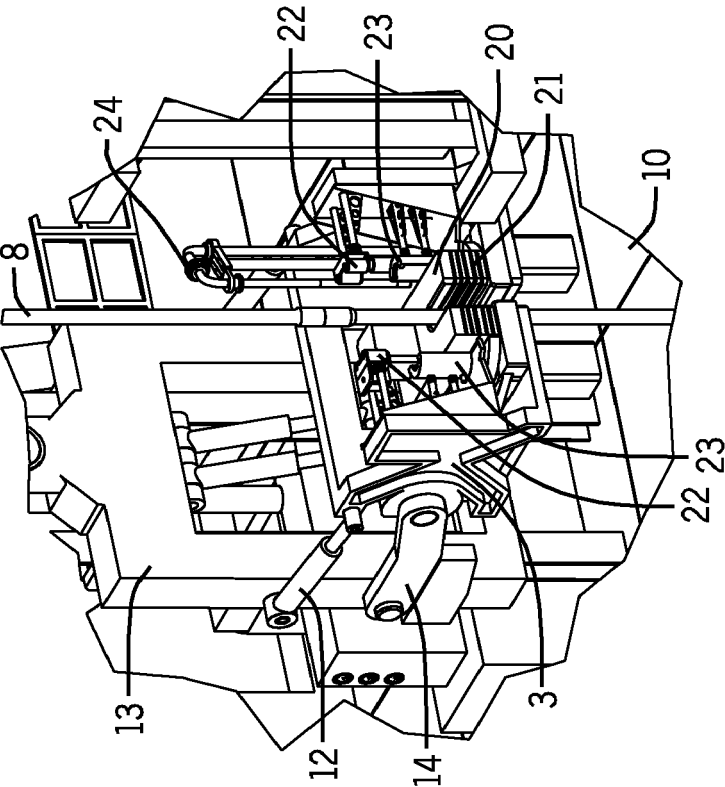
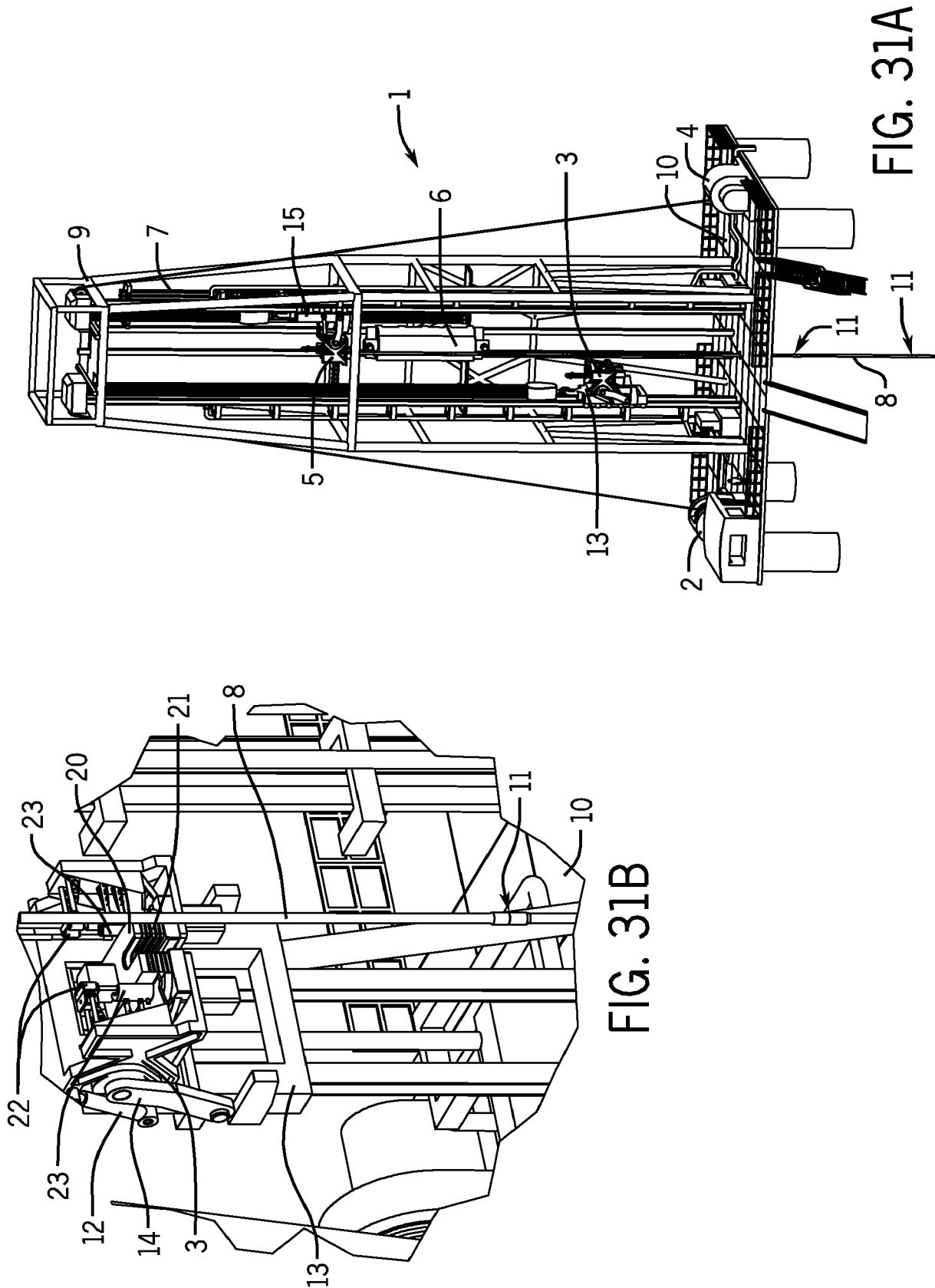
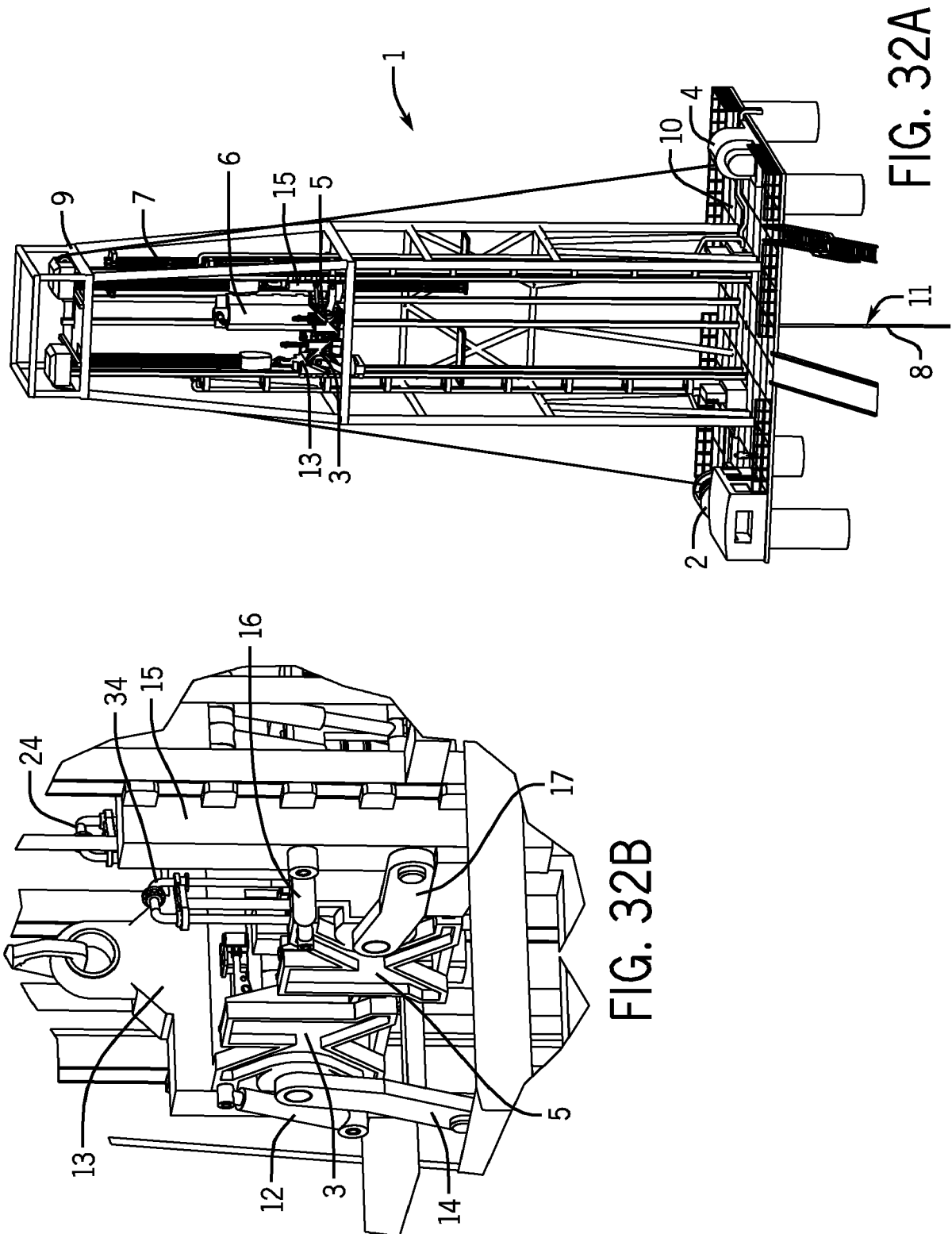


FIG. 30B





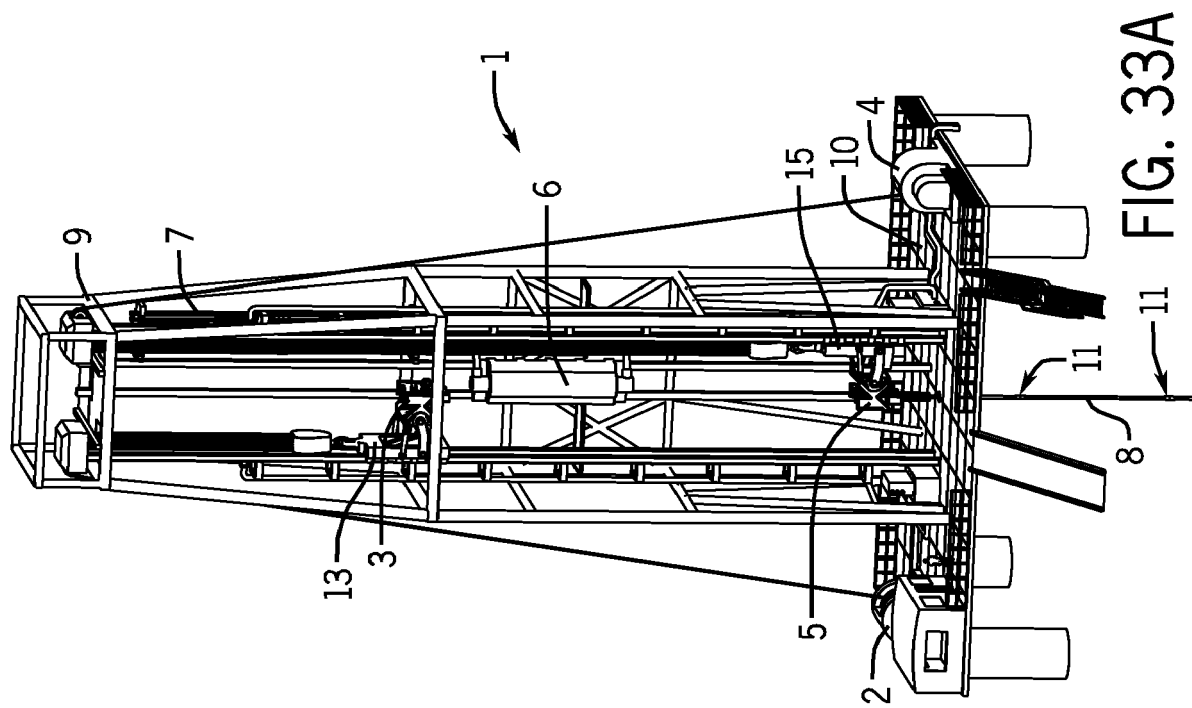


FIG. 33A

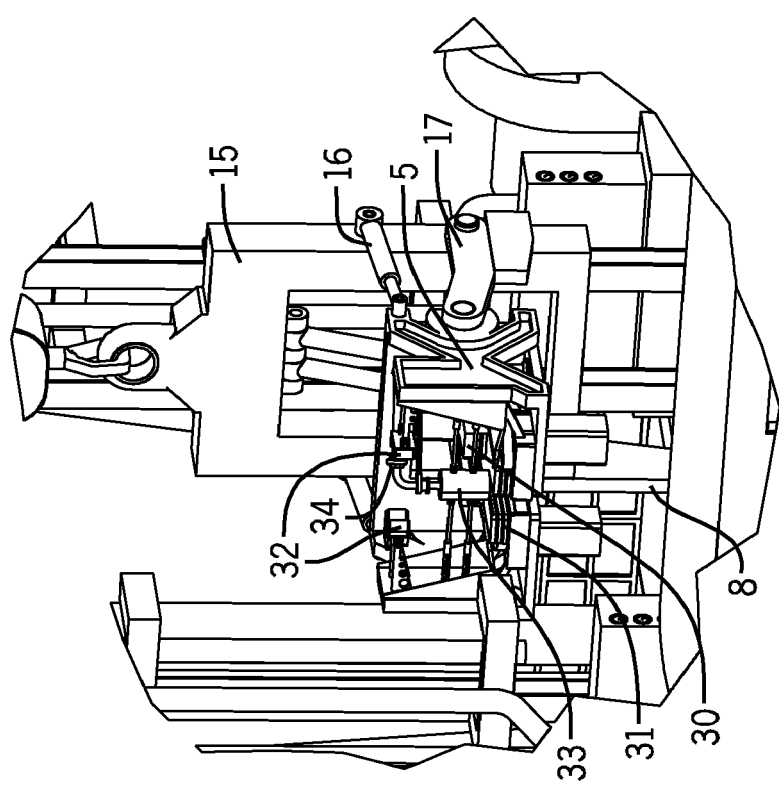


FIG. 33B

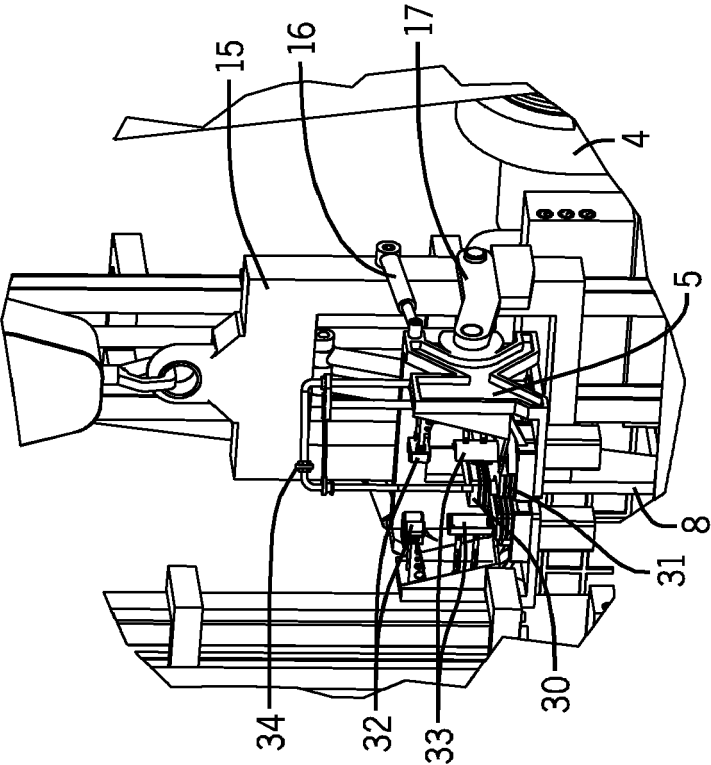
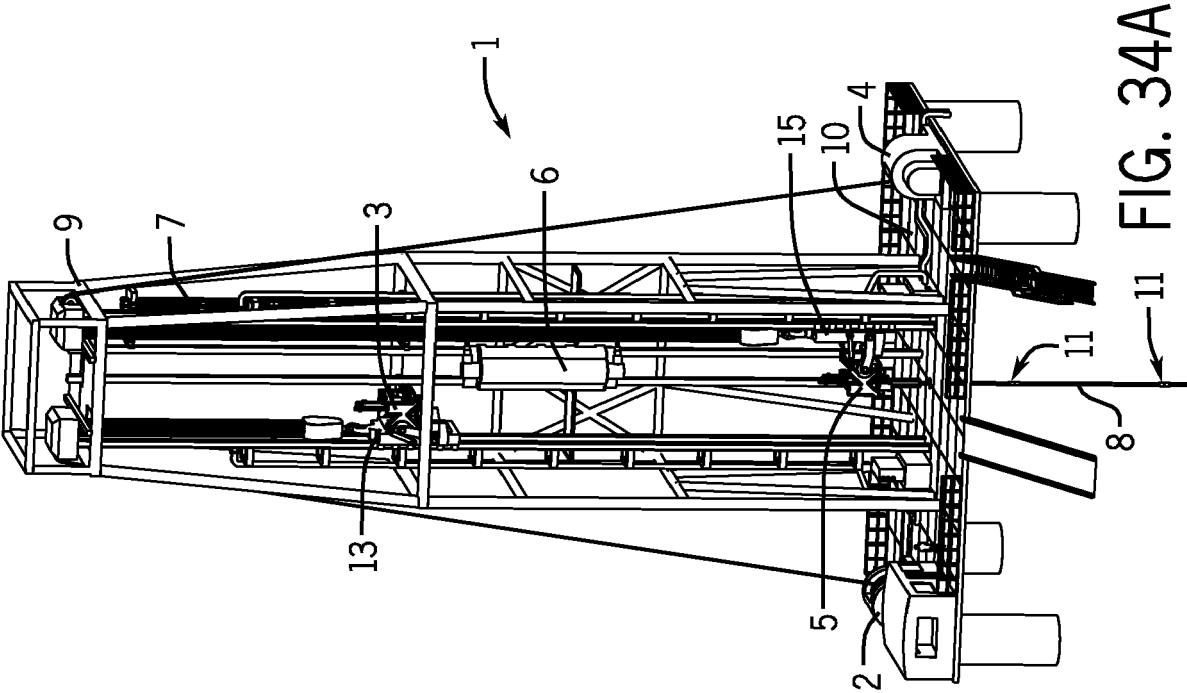


FIG. 34B

FIG. 34A

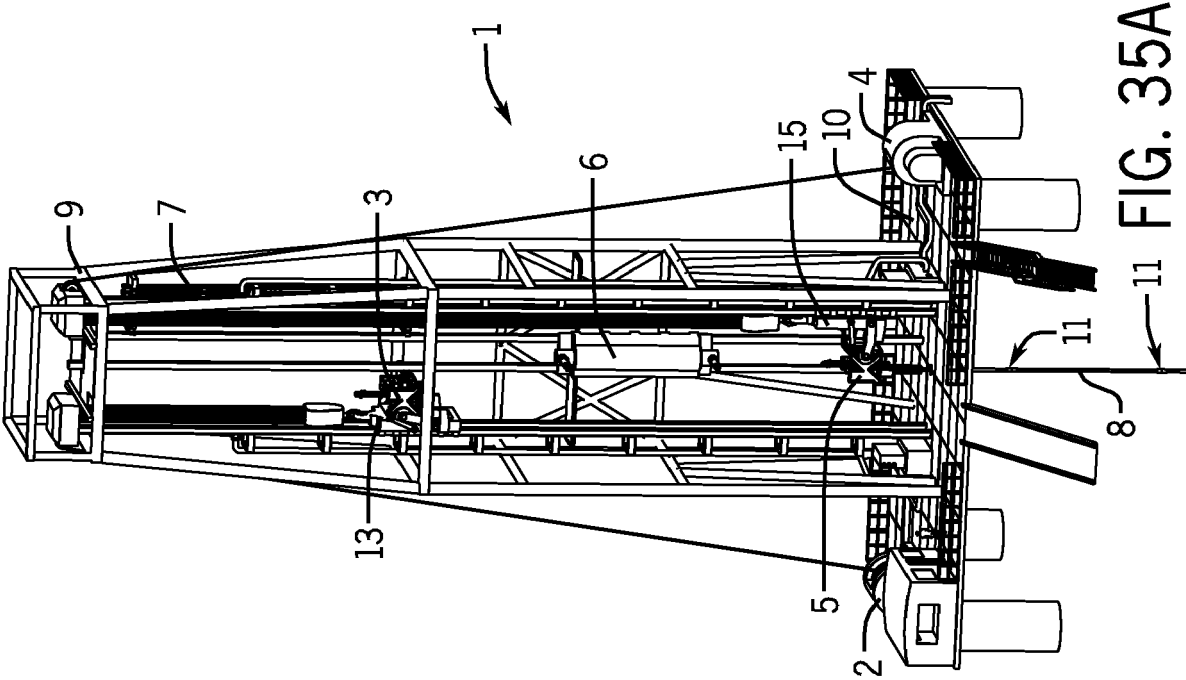


FIG. 35A

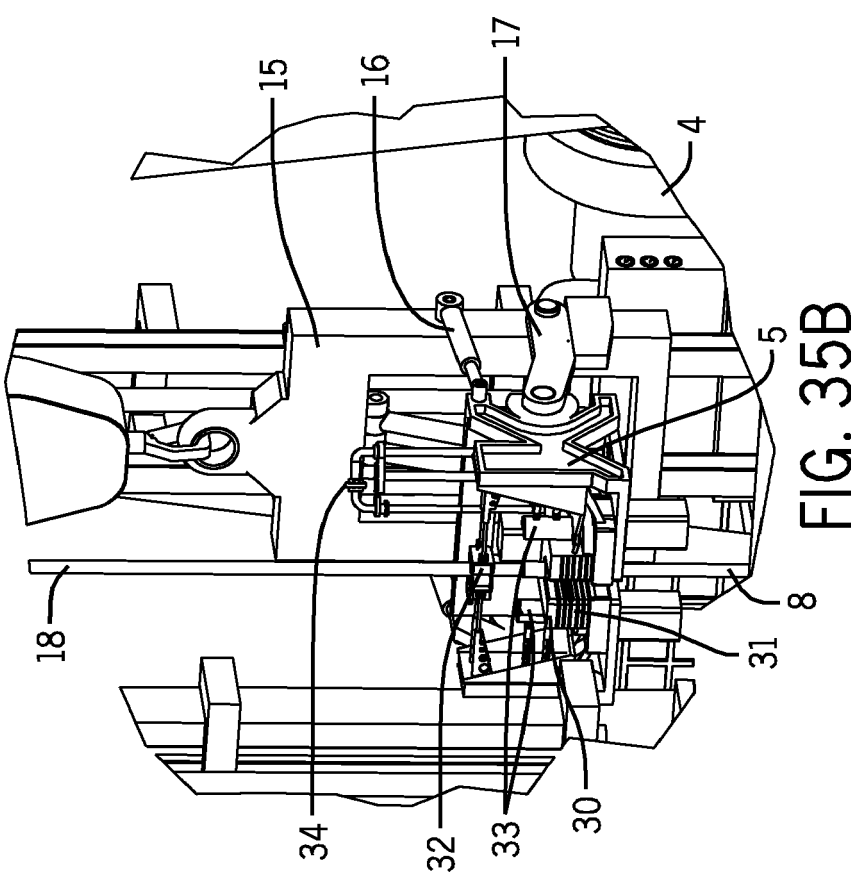
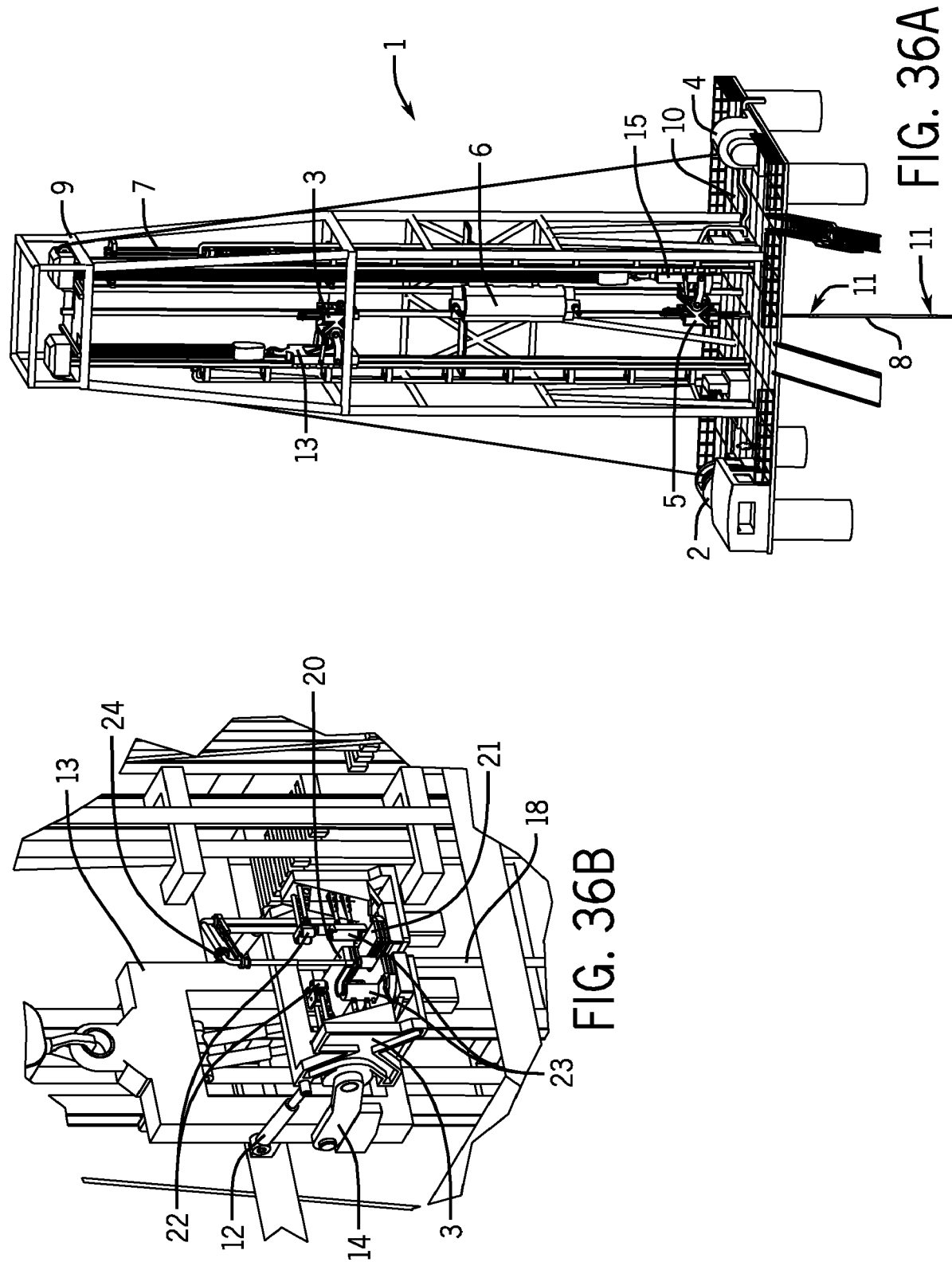
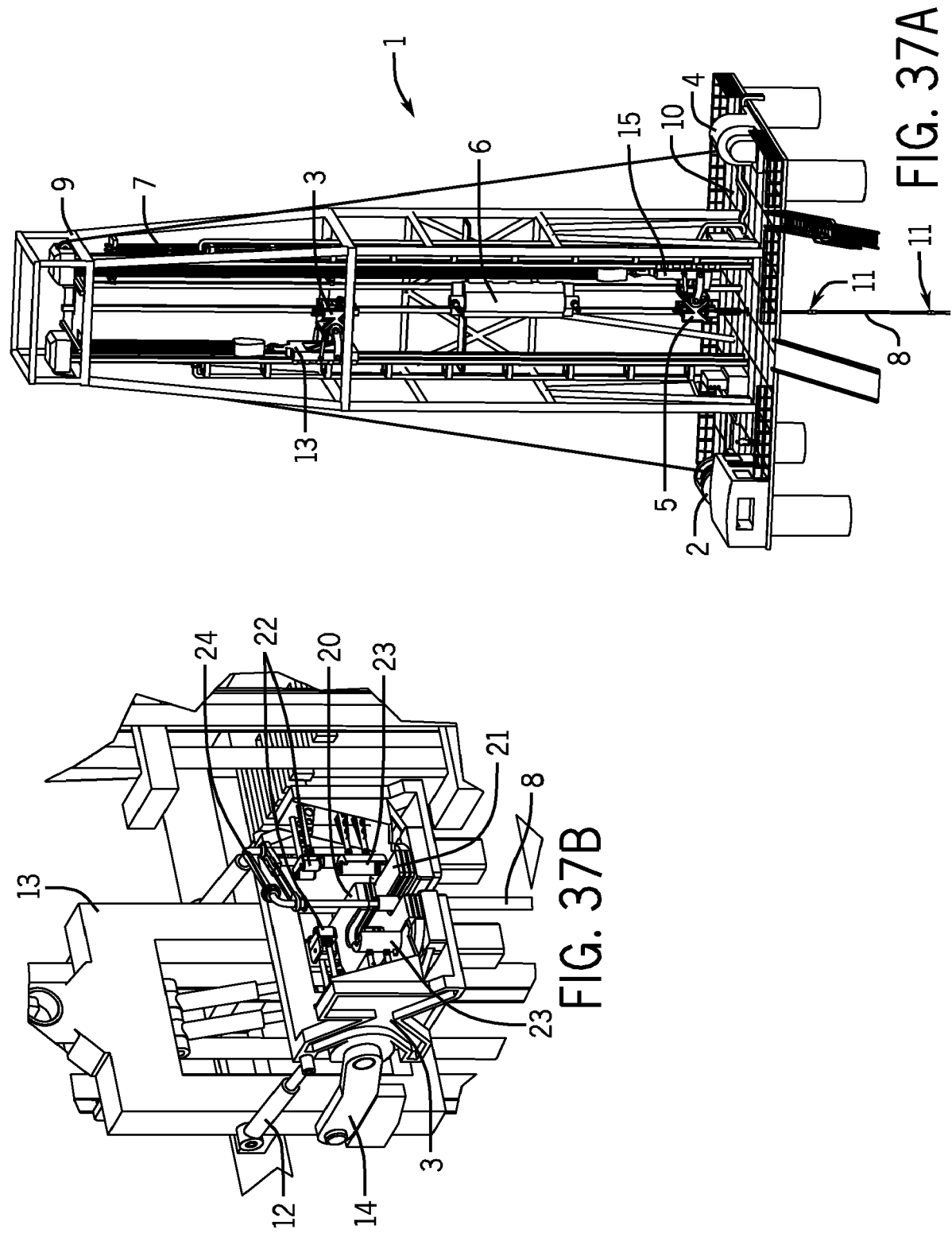
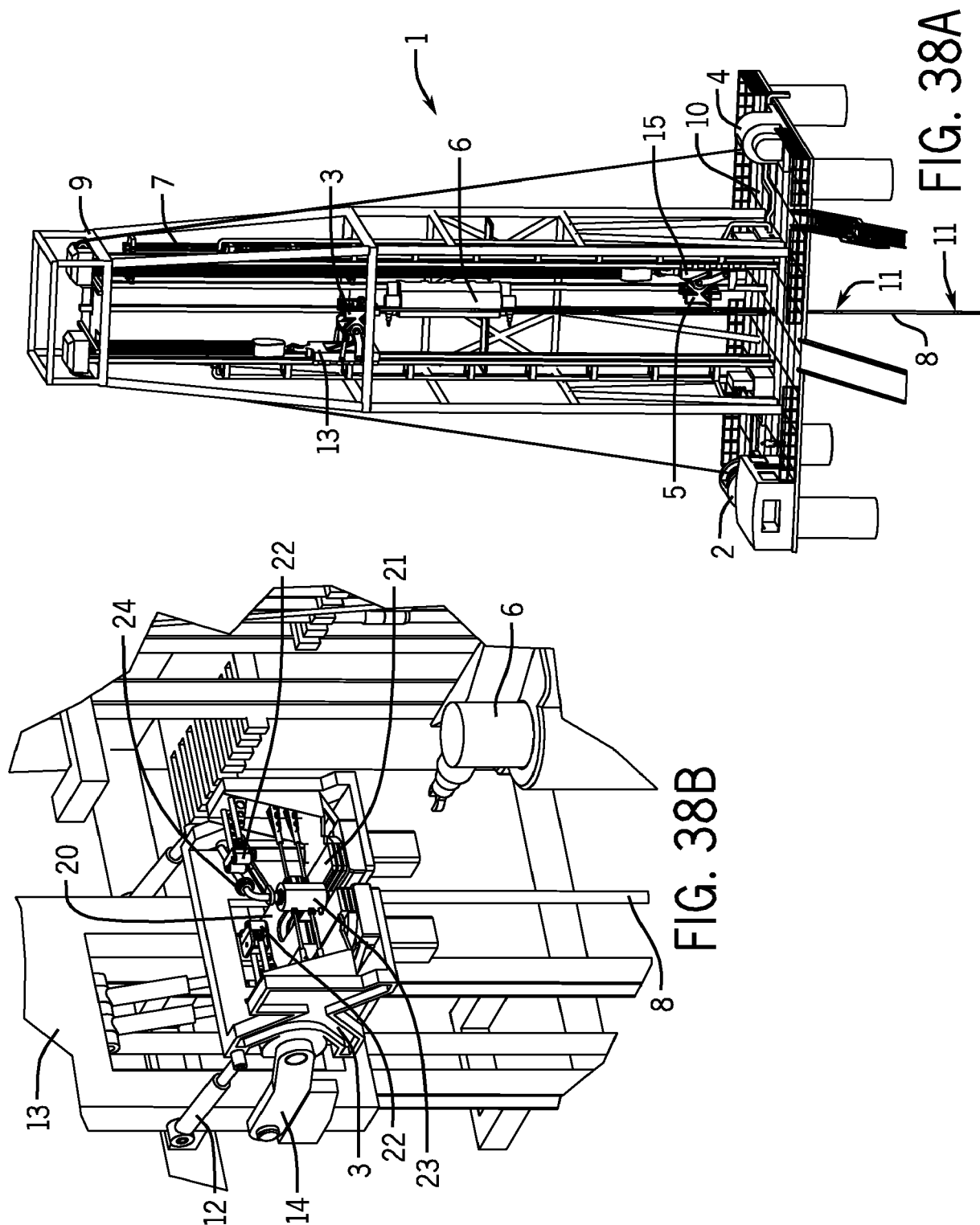


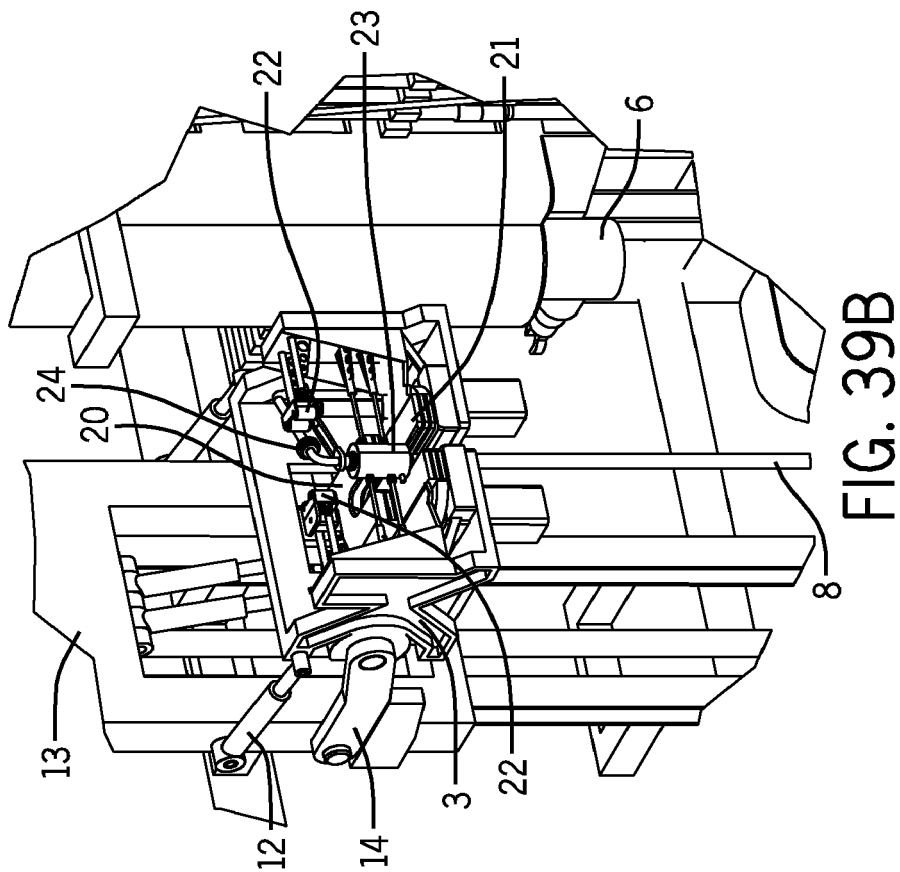
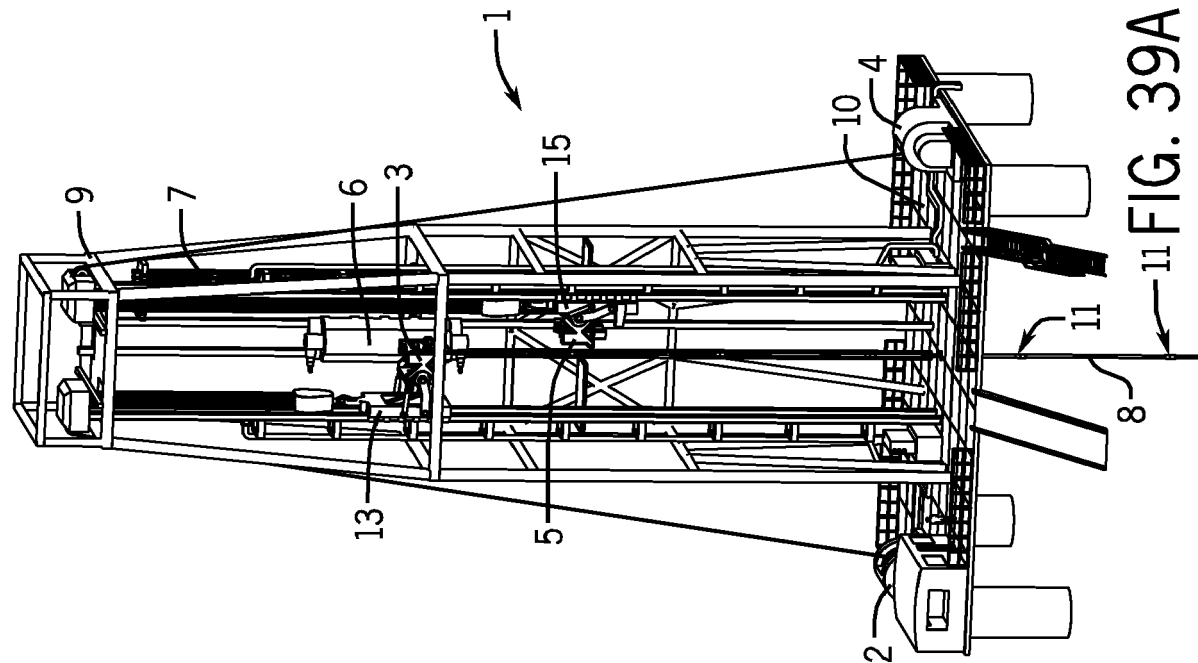
FIG. 35B





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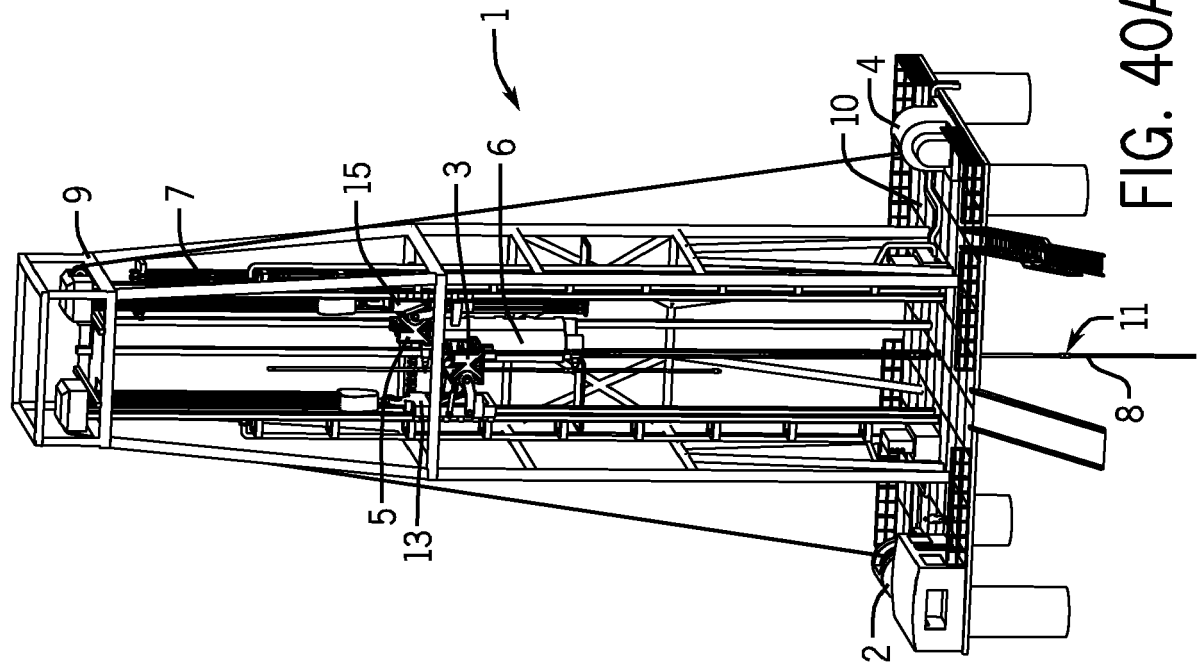


FIG. 40A

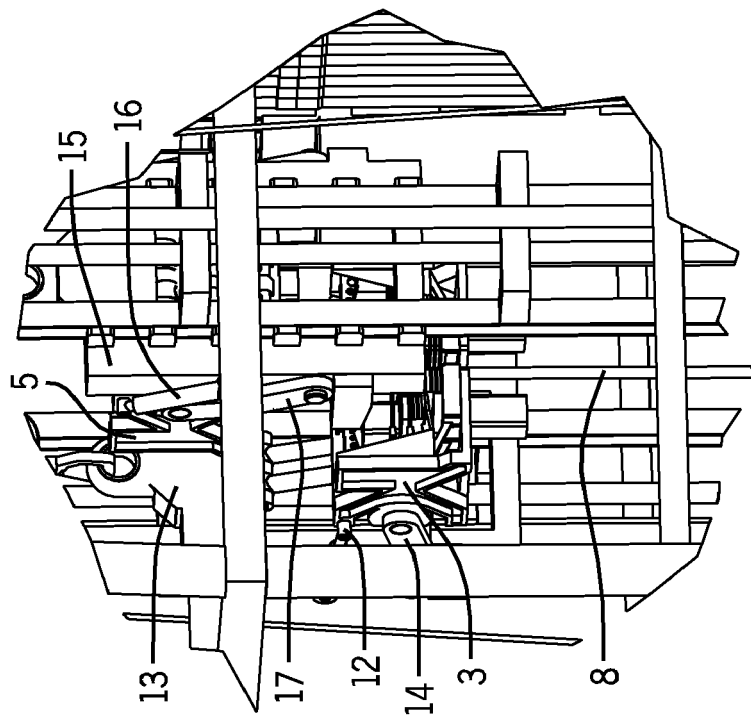


FIG. 40B

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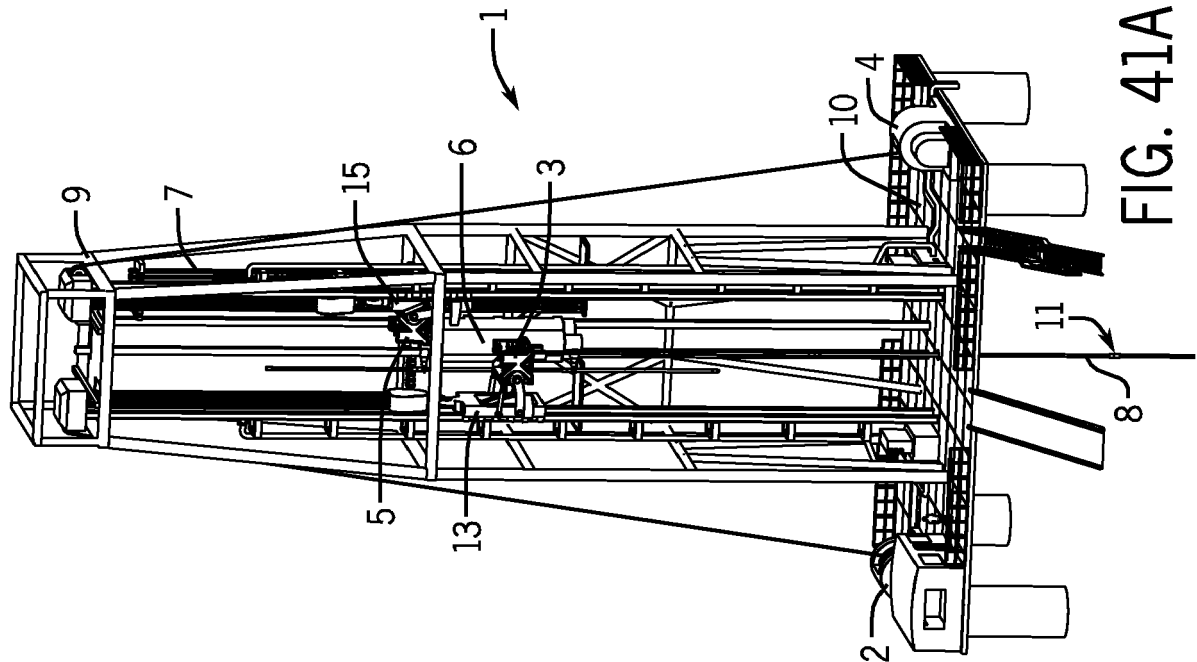


FIG. 41A

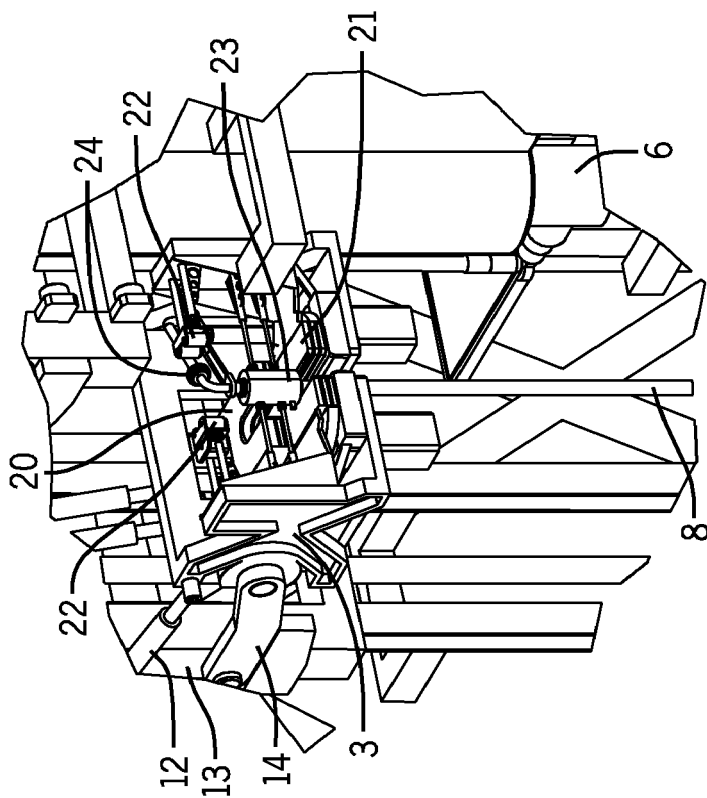


FIG. 41B

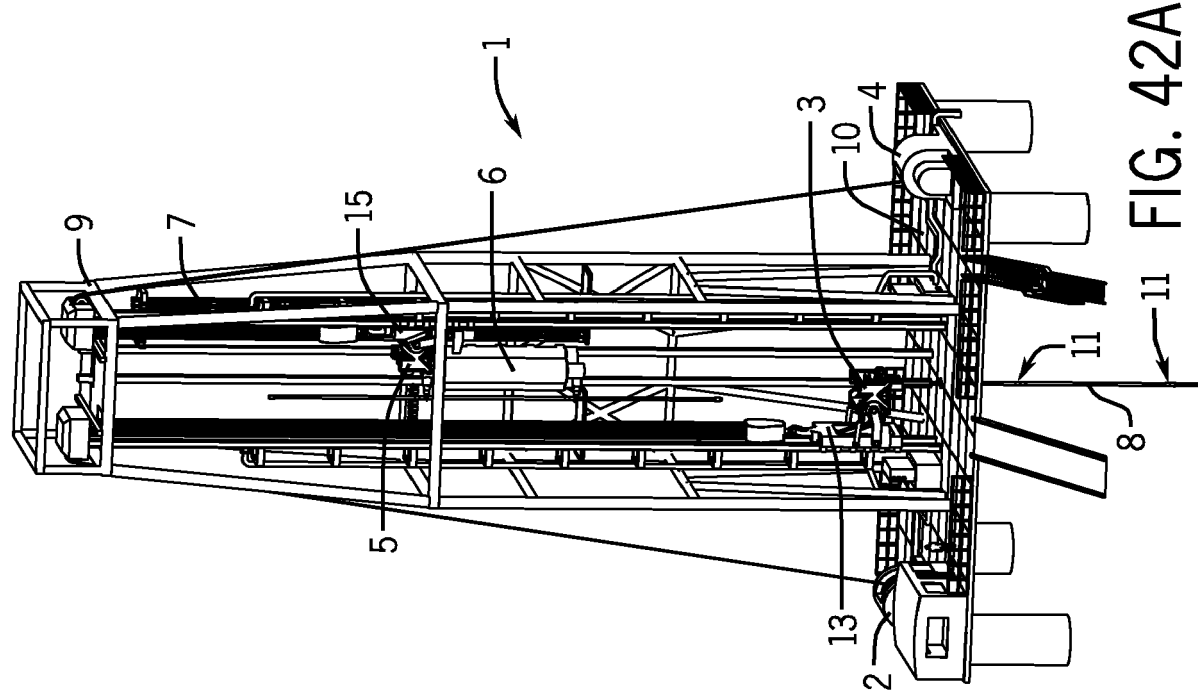


FIG. 42A

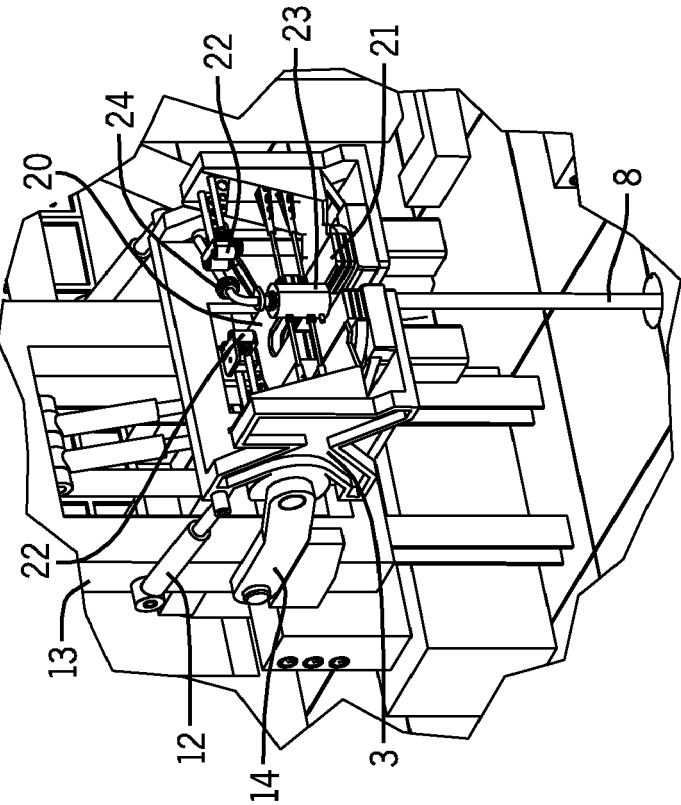
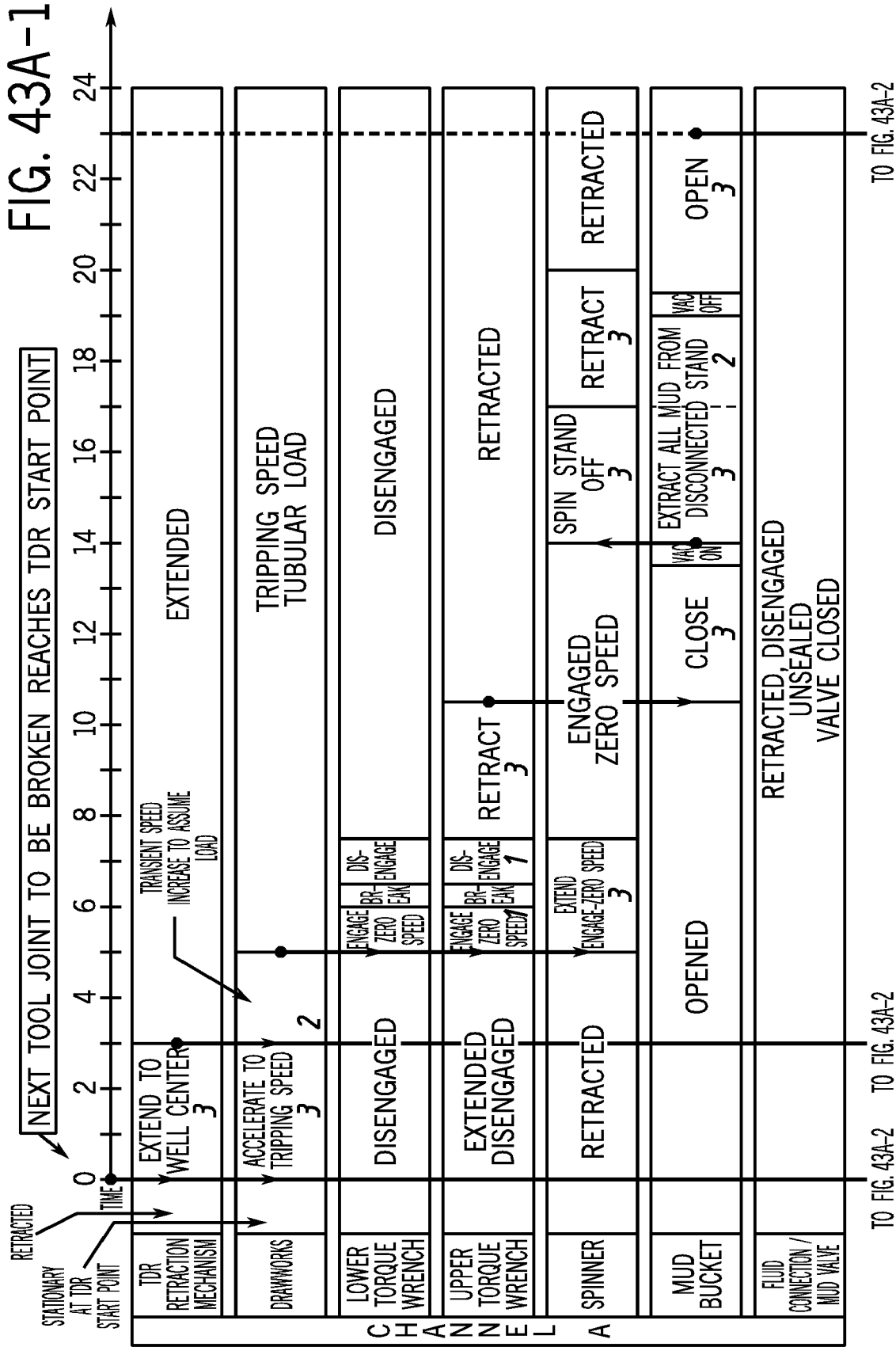
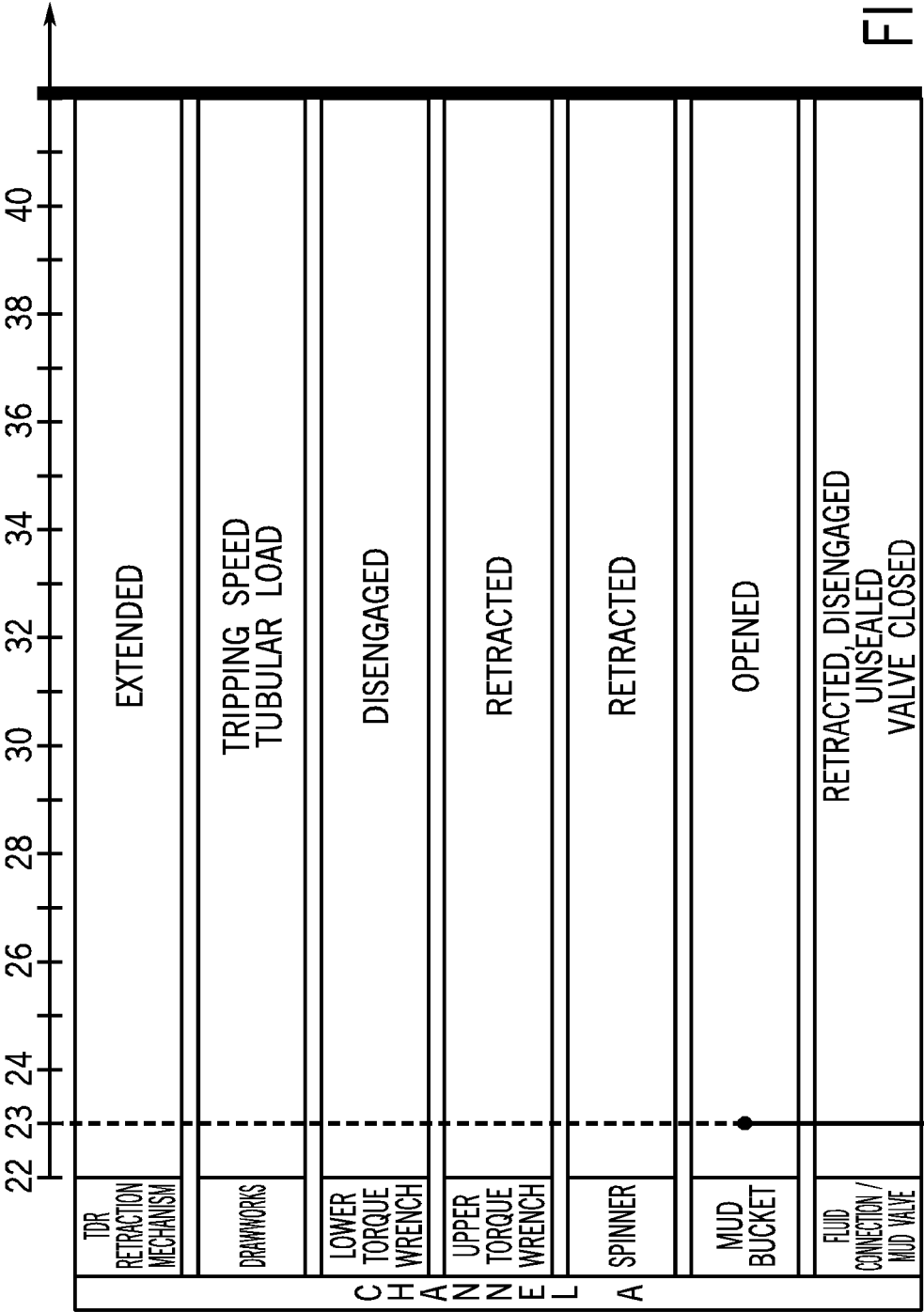


FIG. 42B



FROM FIG. 43A-1		FIG. 43A-2		FROM FIG. 43A-1	
TDR RETRACTION MECHANISM	EXTENDED	RETRACT	3	RETRACTED	
DRAWWORKS	TRIPPING SPEED LOADED	2	REDUCED SPEED UNLOADED	DECELERATE TO REST	ACCELERATE TO LOWERING SPEED
				3	3
LOWER TORQUE WRENCH	REDUCE TORQUE TO RELEASE LOAD	2	SPEED DECREASE TO UNCOUPLE TDR FROM TOOL JOINT		
UPPER TORQUE WRENCH	RETRACTED	EXTEND	3	EXTENDED DISENGAGED	
SPINNER	RETRACTED				
MUD BUCKET	OPENED				
FLUID CONNECTION / MUD VALVE	RETRACTED, DISENGAGED UNSEALED VALVE CLOSED				
RACKING ARM	EXTEND	3	APPLY STAND LIFTING FORCE TO TOOL JOINTS	TRIPPING SPEED LIFTING AND CONTROLLING STAND	
			2		
	RETRACTED STATIONARY BOTTOM				



TO FIG. 43B-2

FROM FIG. 43B-1

CHANNEL					RETRACTED				
TDR RETRACTION MECHANISM									
DRAWWORKS	LOWERING NOT TO SCALE	DECELERATE TO REST 3	STATIONARY AT TDR START POINT						
LOWER TORQUE WRENCH					DISENGAGED				
UPPER TORQUE WRENCH					EXTENDED DISENGAGED				
SPINNER					RETRACTED				
MUD BUCKET					OPENED				
FLUID CONNECTION / MUD VALVE					RETRACTED, DISENGAGED UNSEALED VALVE CLOSED				
RACKING ARM	REMOVE STAND FROM TDR 3	DECELERATE TO REST 2	MOVE STAND TO RACK NOT TO SCALE	RETRACT NOT TO SCALE	LOWER TO CYCLE START POINT (BOTTOM OF TRAVEL) NOT TO SCALE	RETRACTED STATIONARY			

FIG. 43B-2

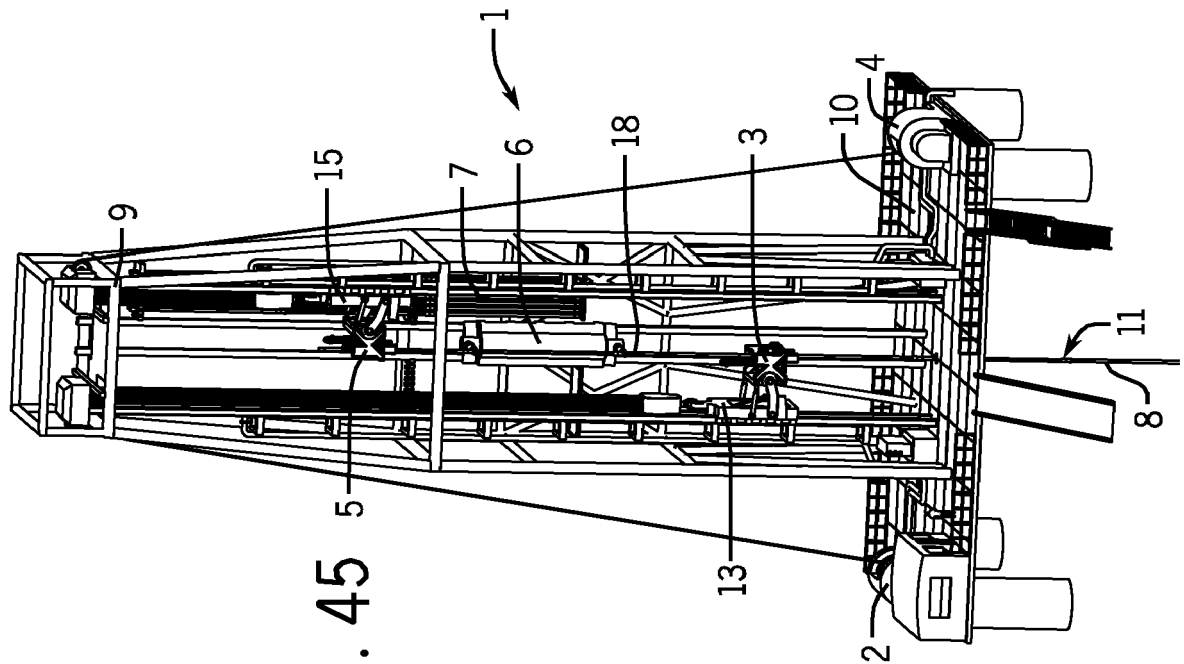


FIG. 45

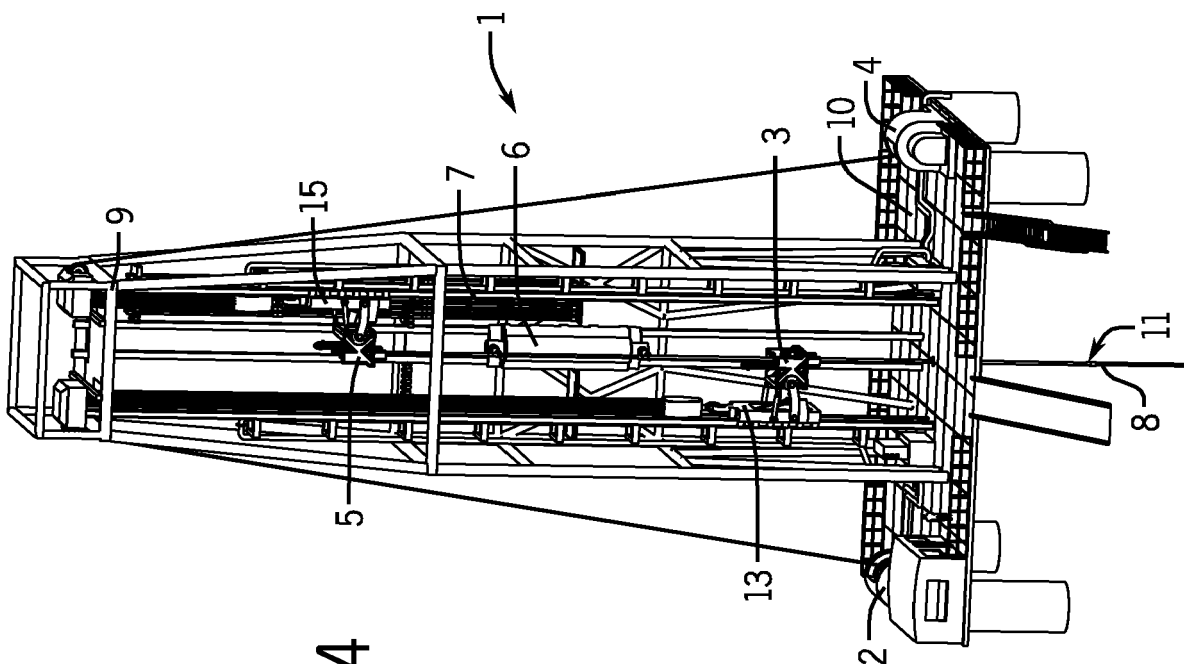


FIG. 44

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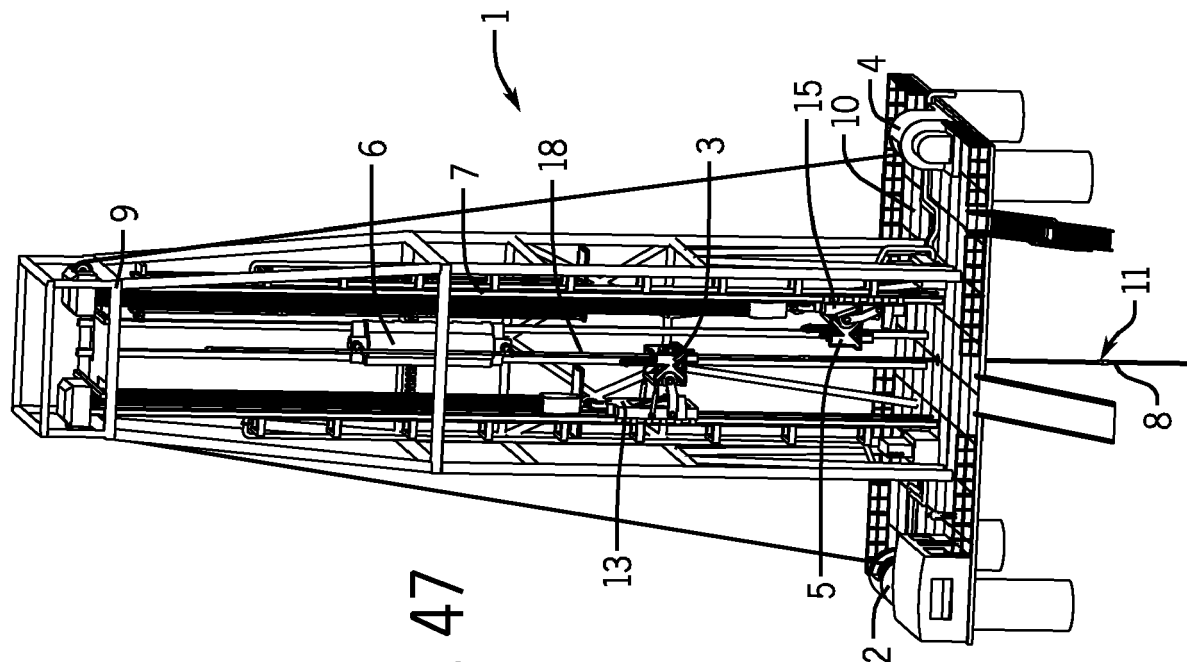


FIG. 47

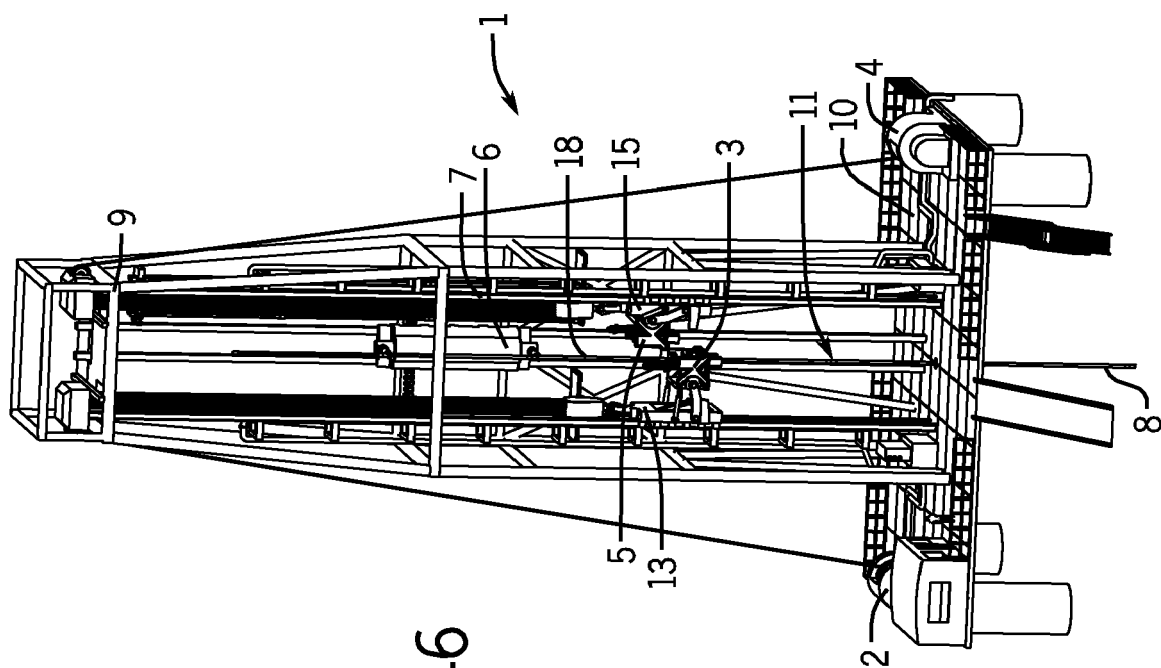
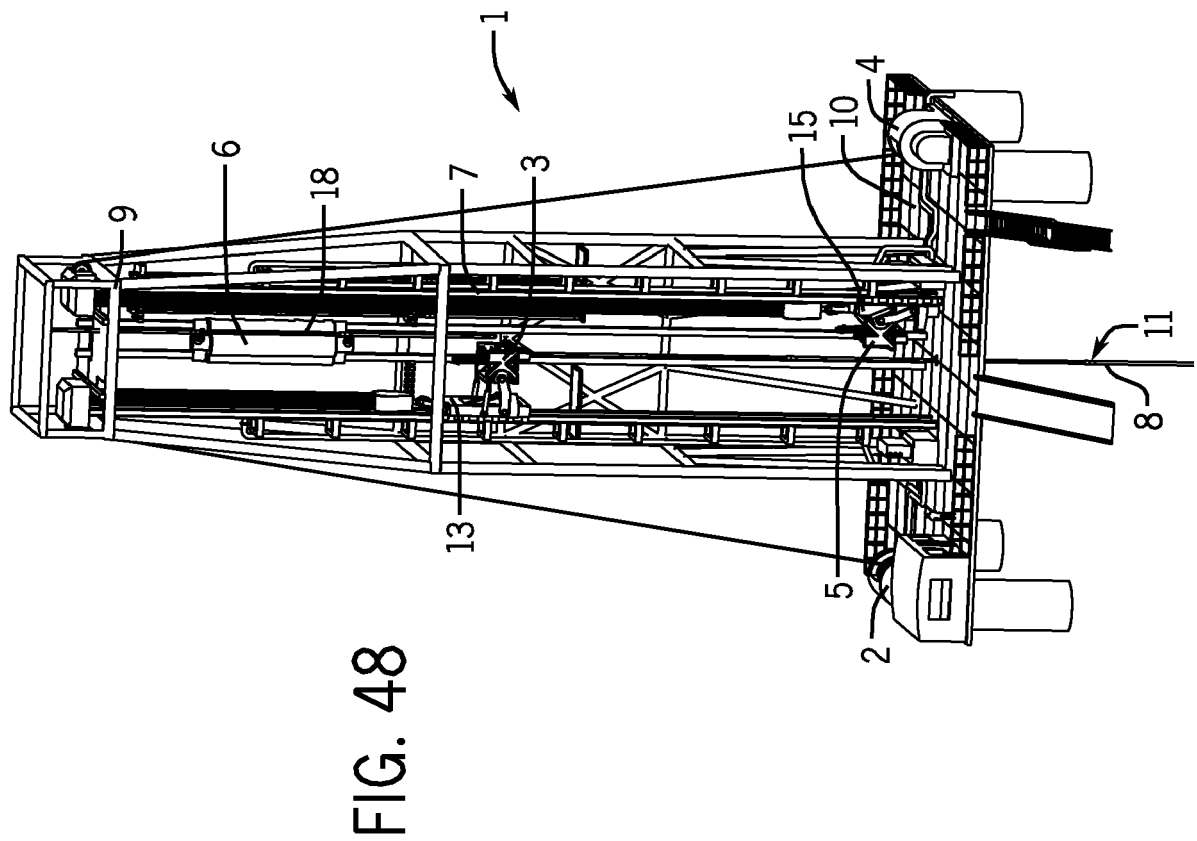
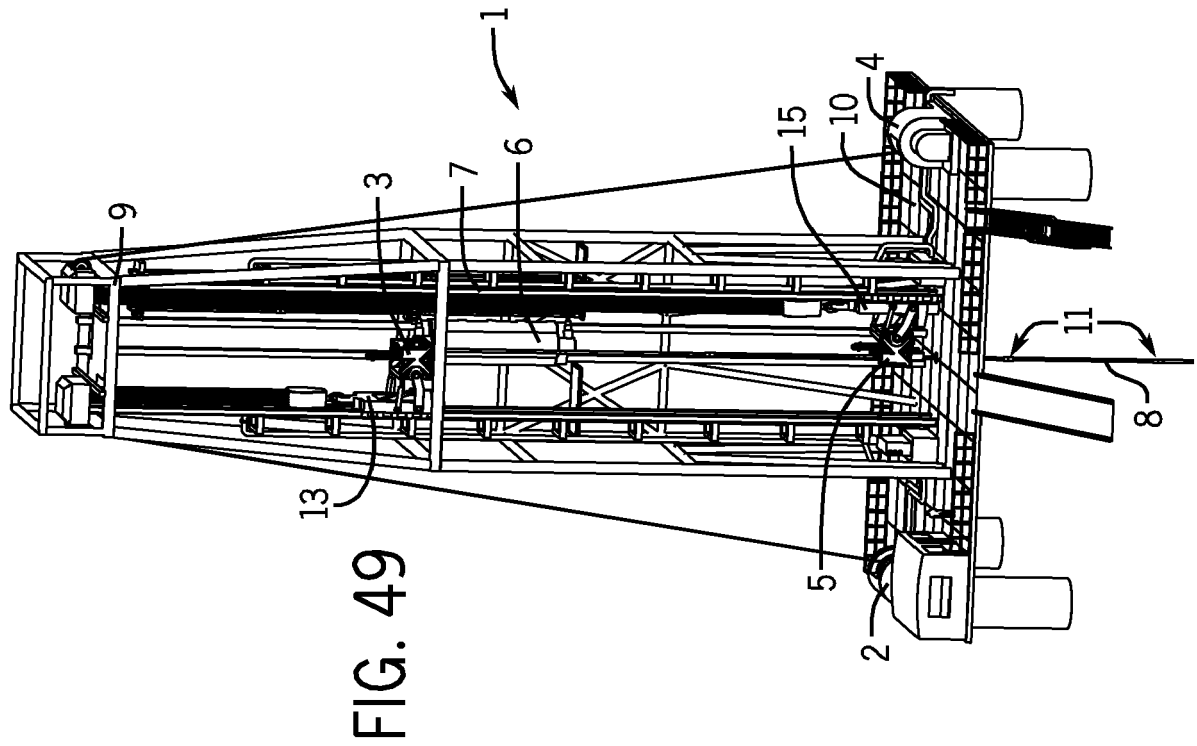
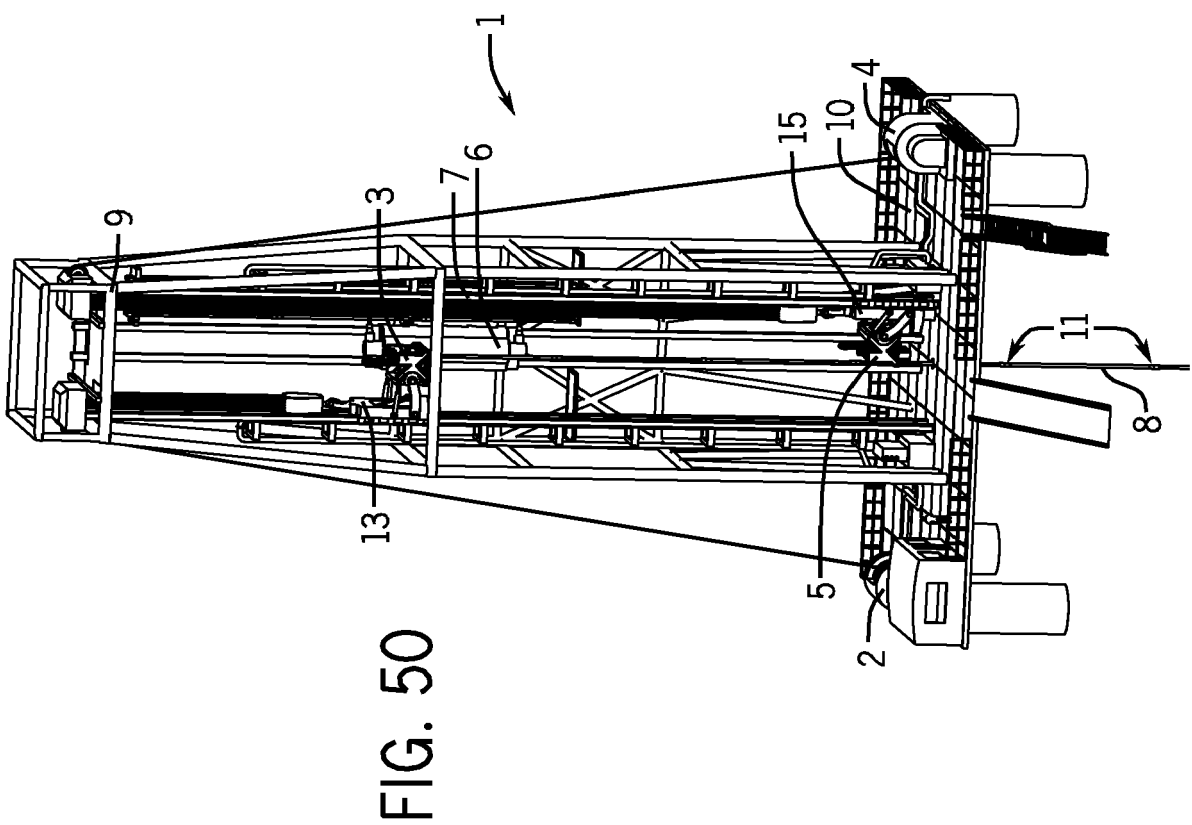
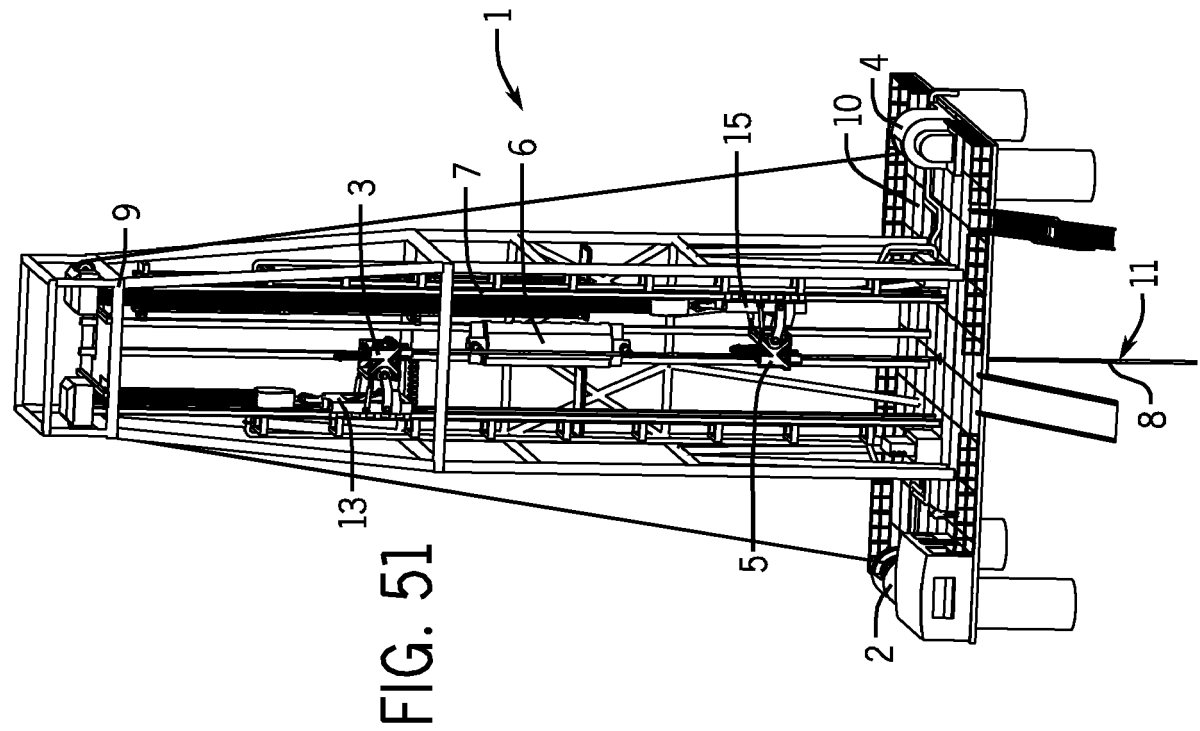


FIG. 46

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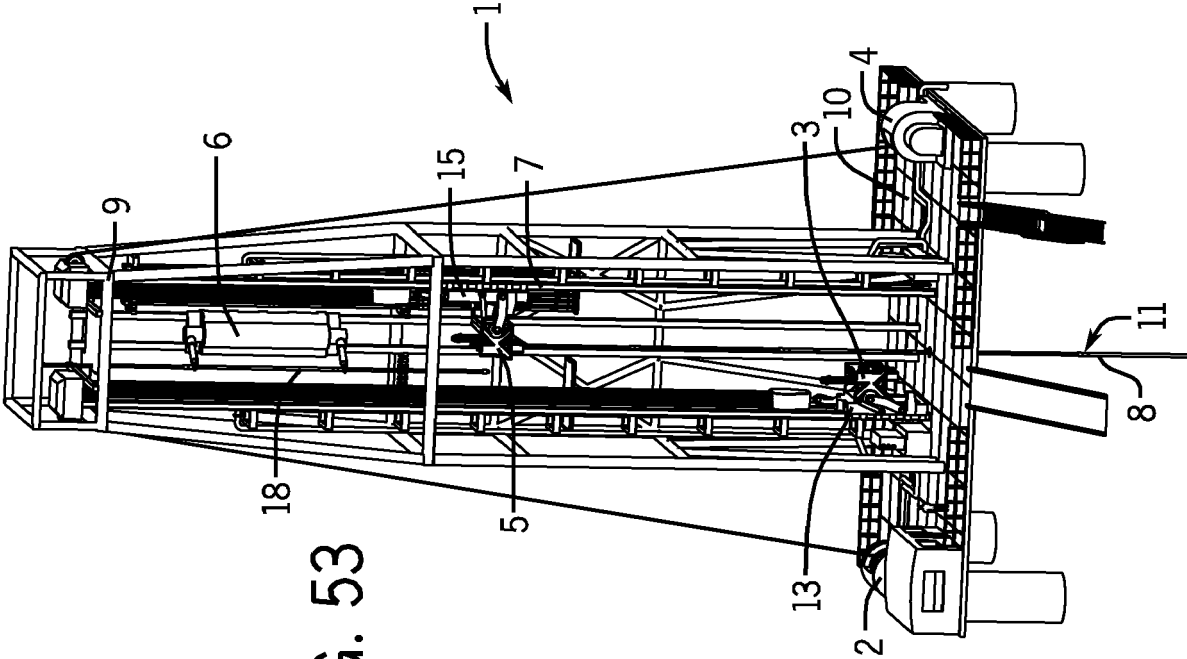


FIG. 53

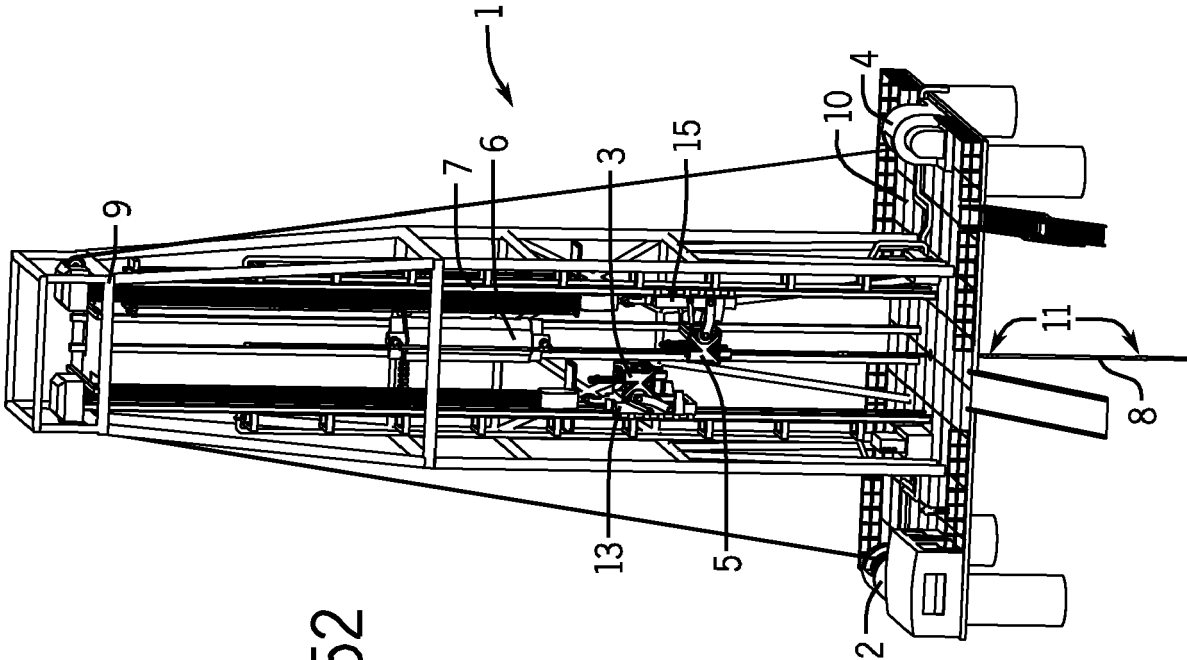


FIG. 52

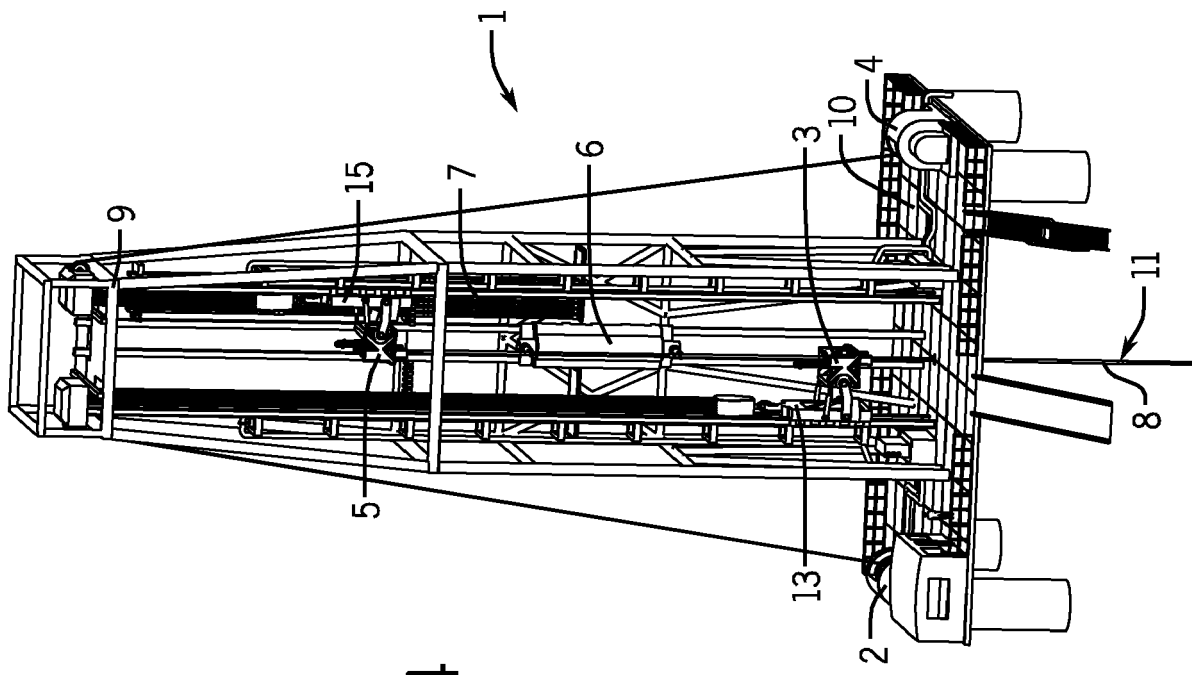
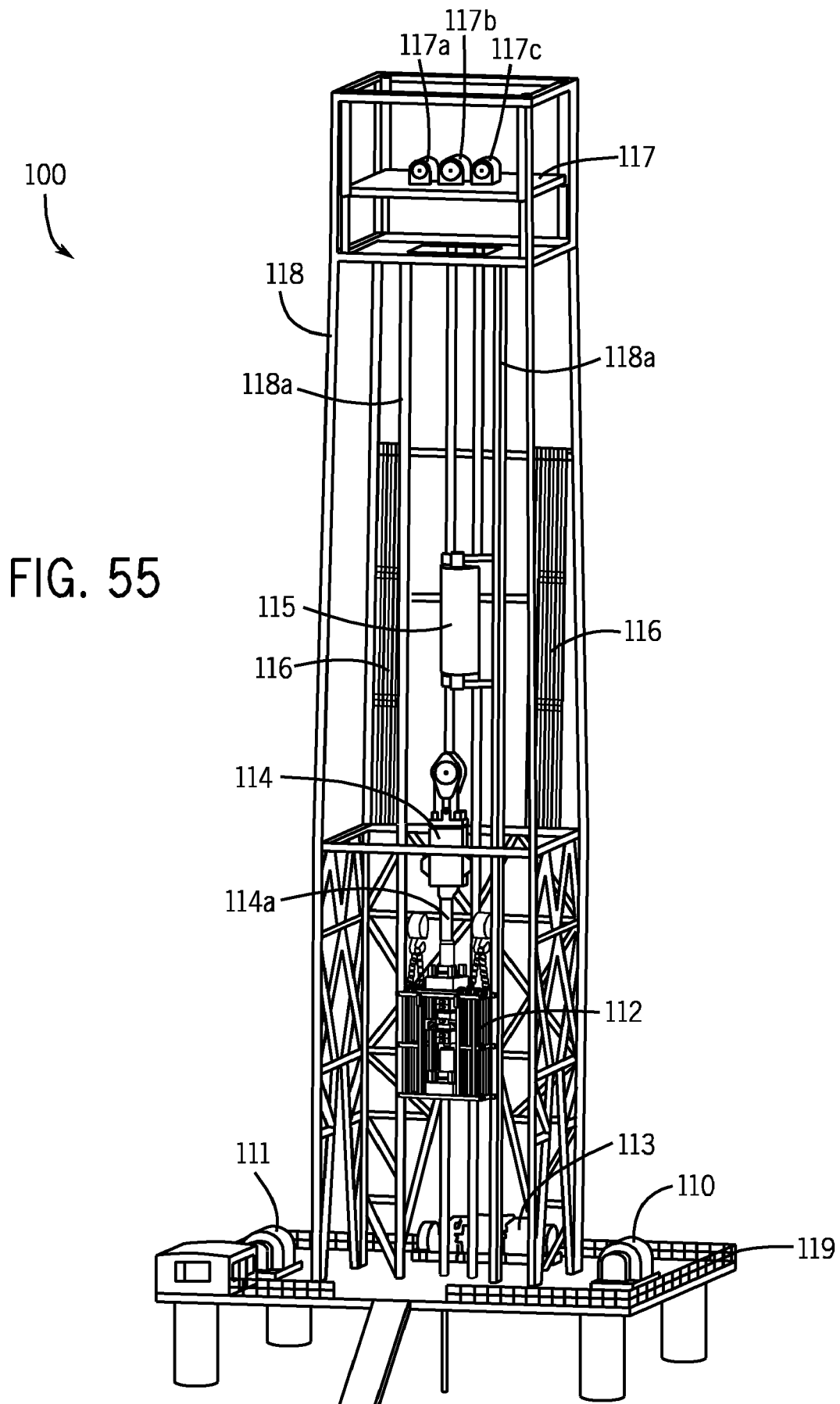


FIG. 54

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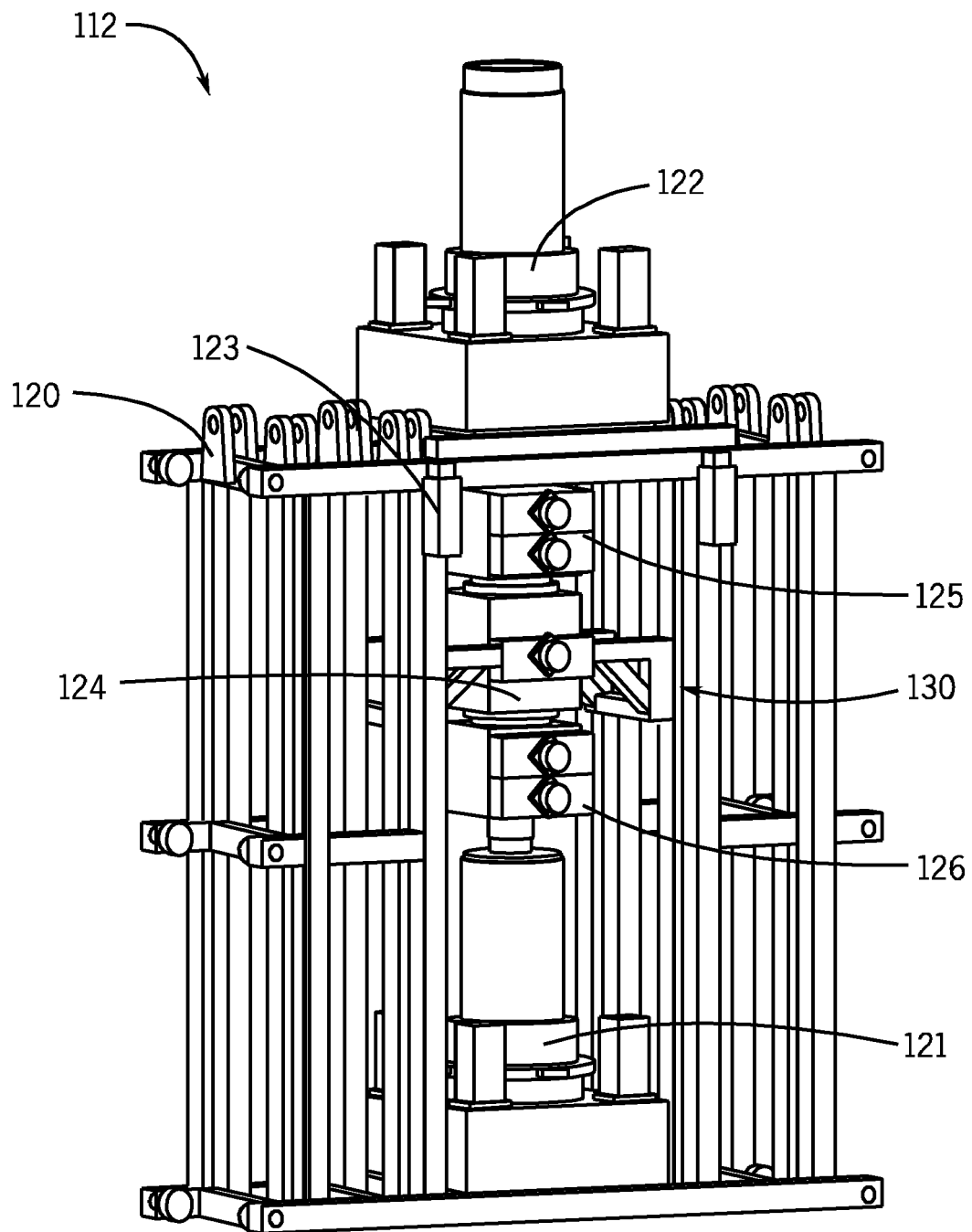


FIG. 56

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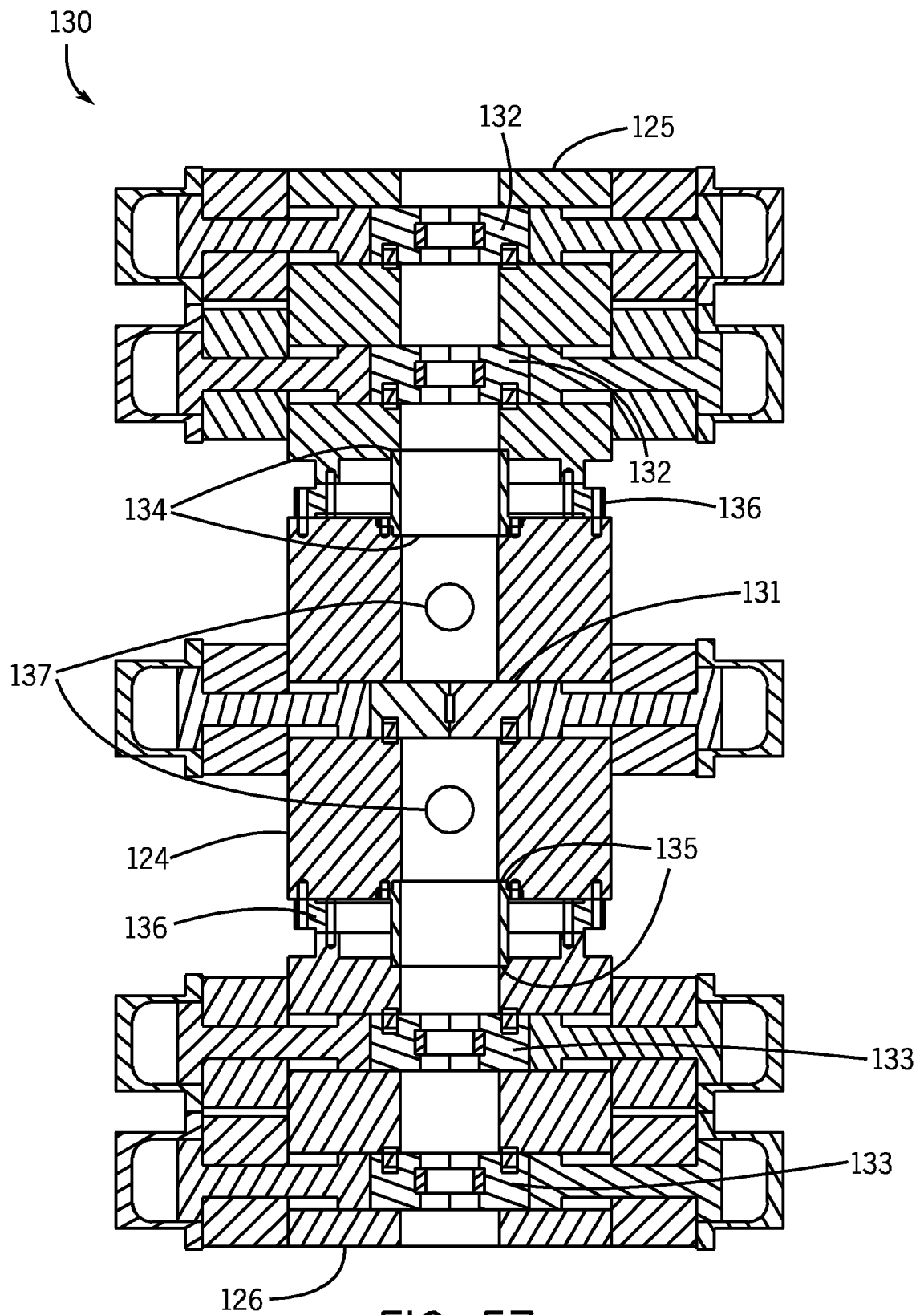


FIG. 57

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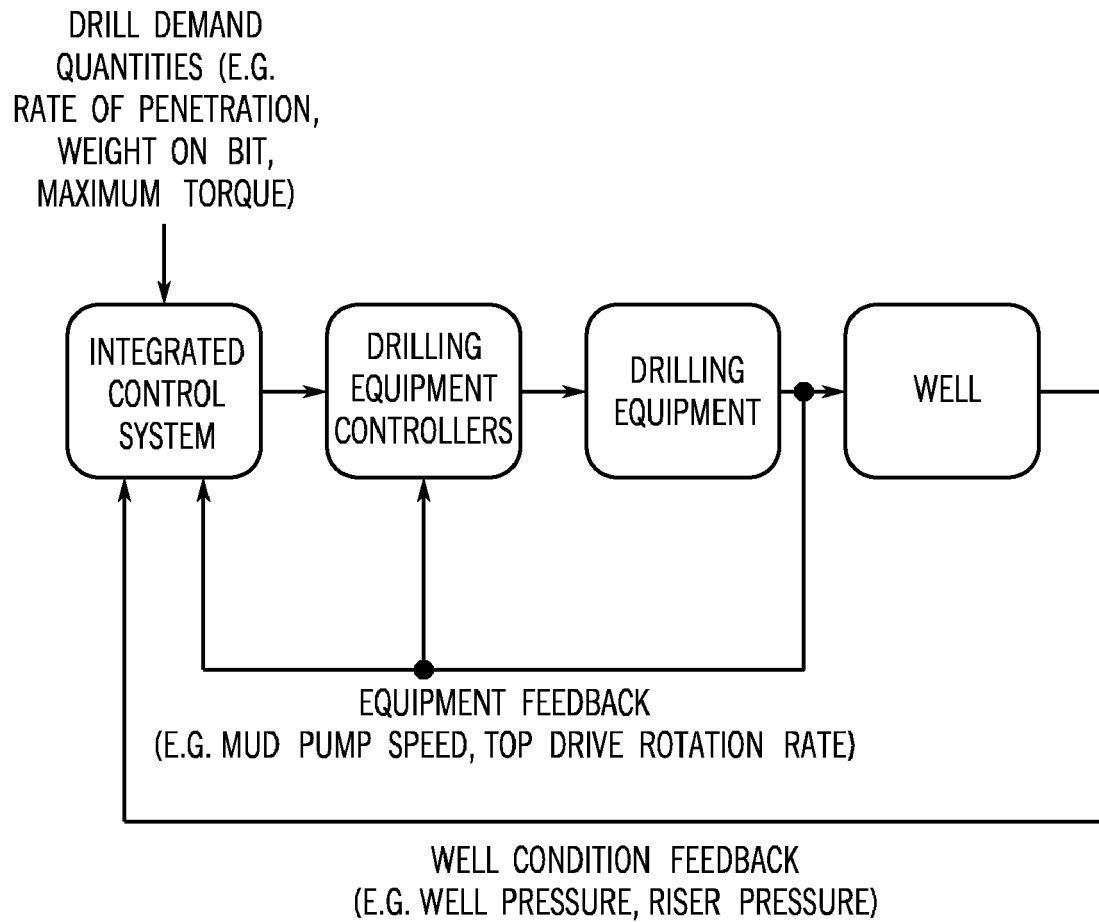


FIG. 58

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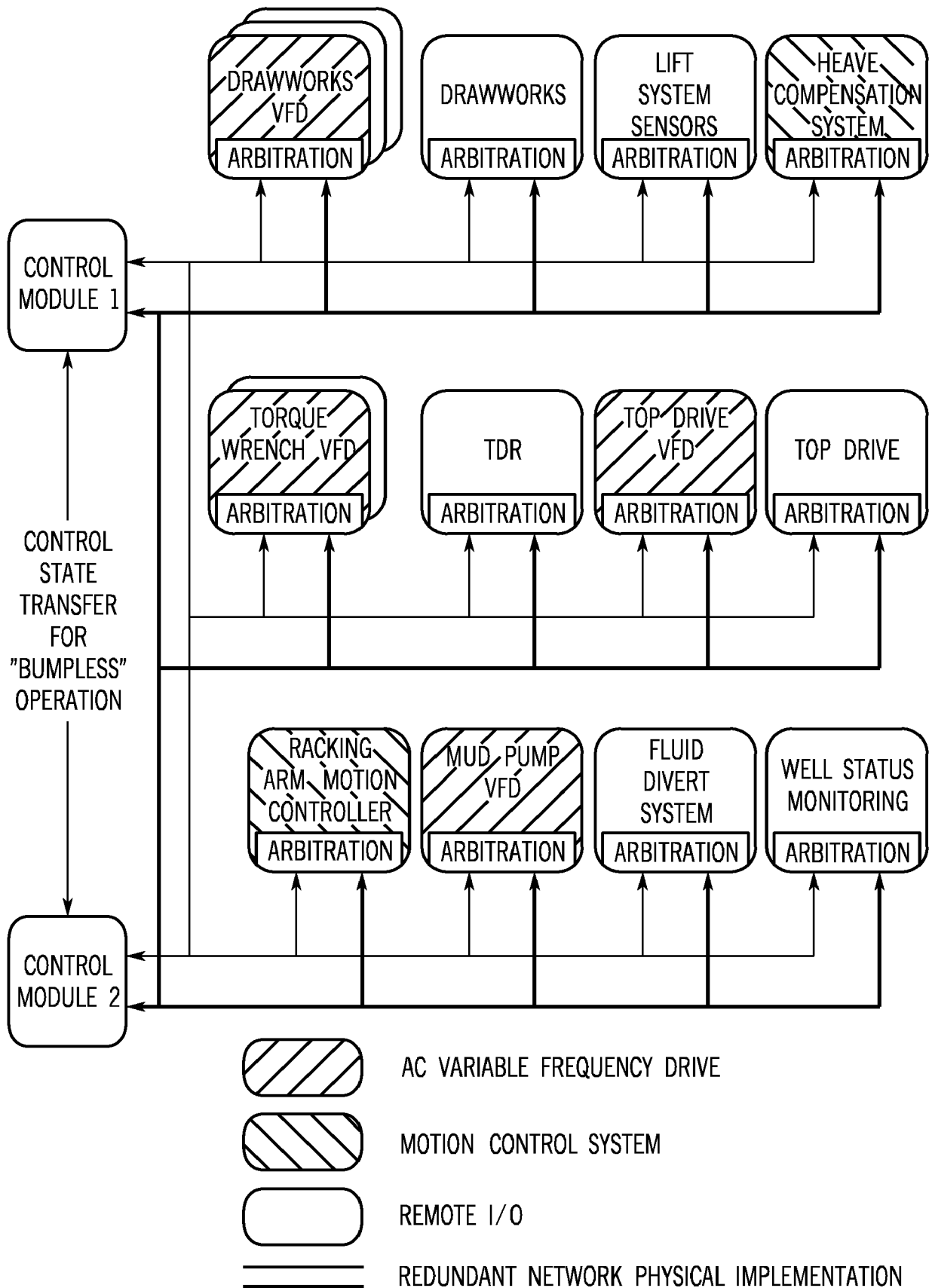
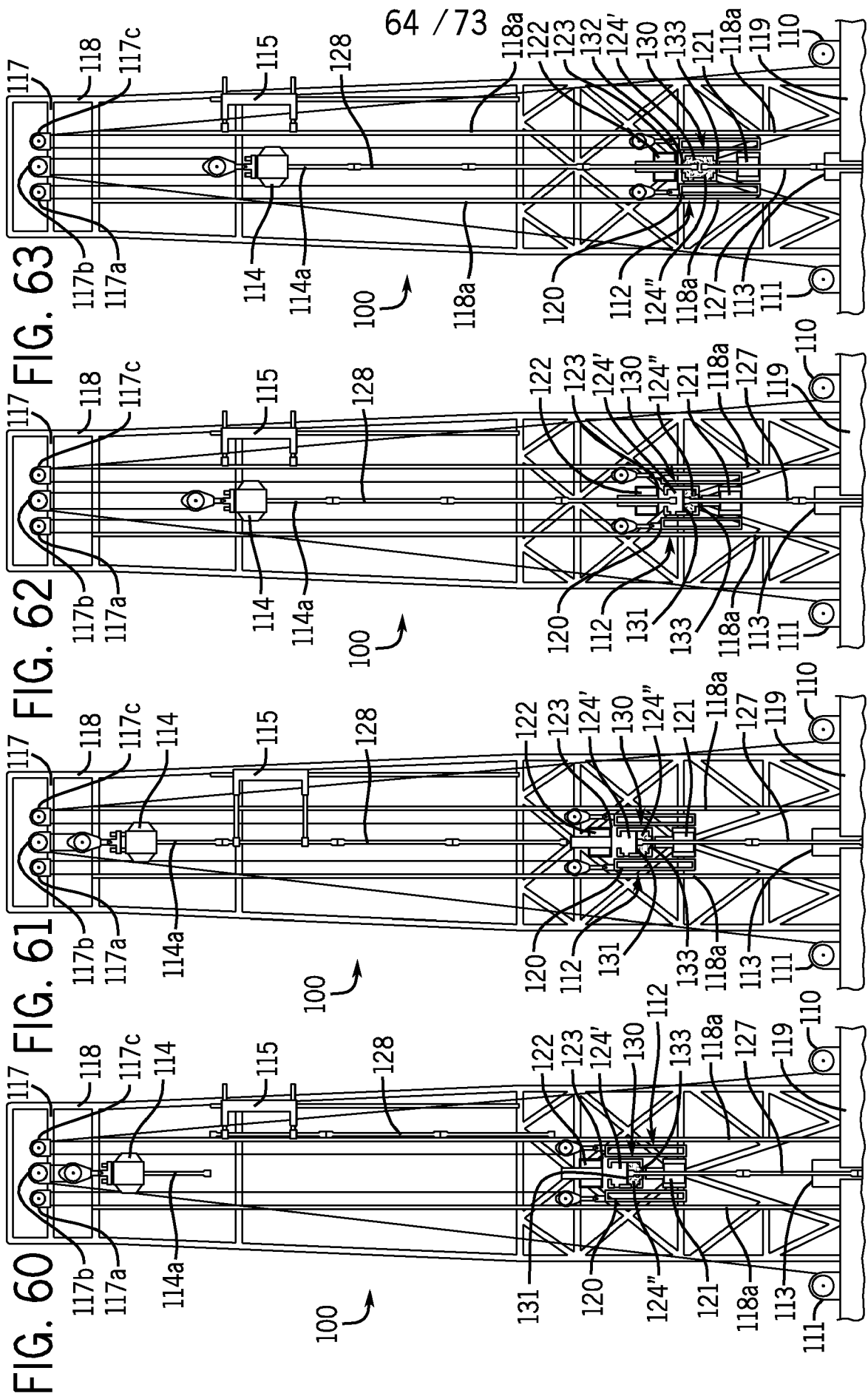
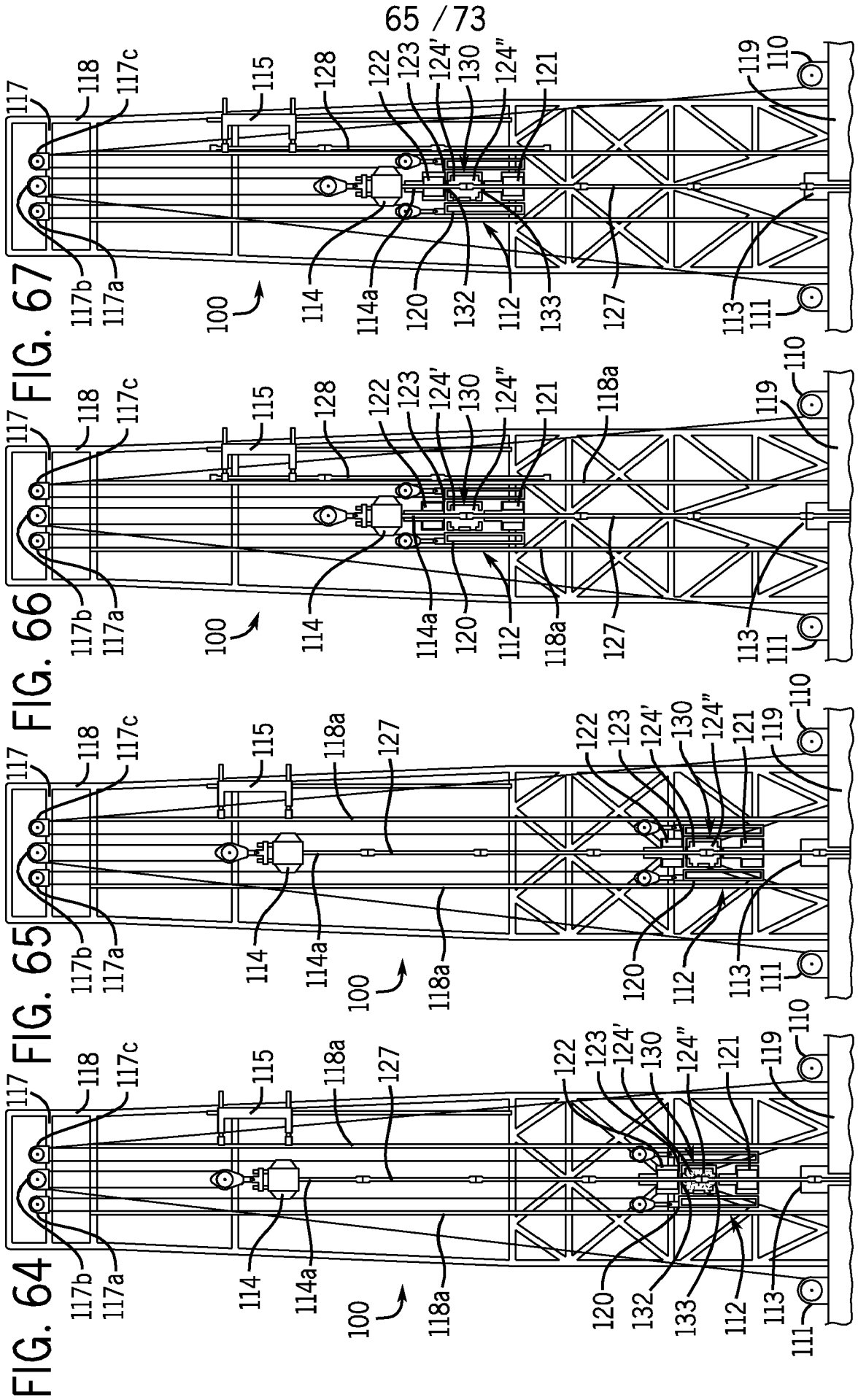
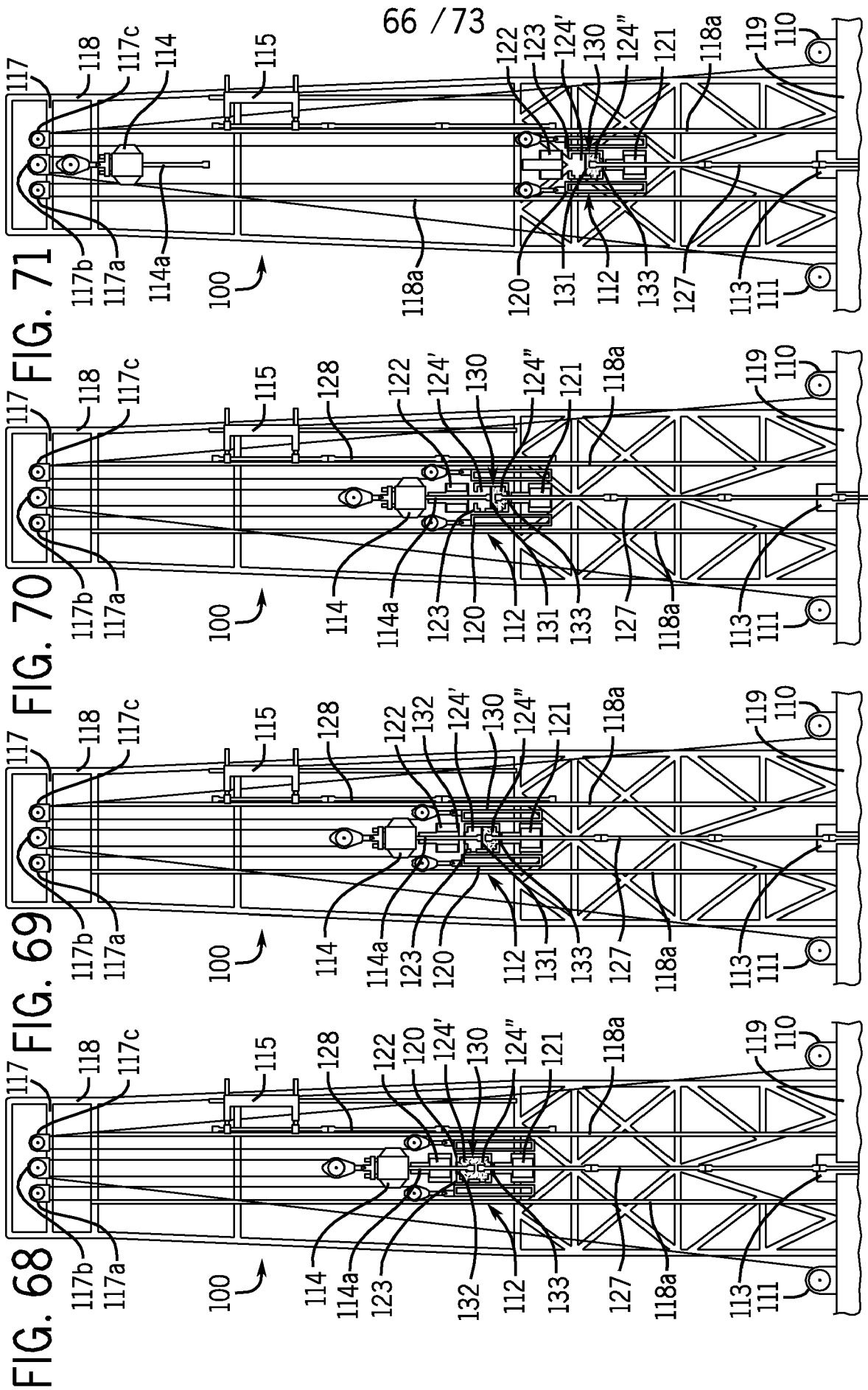
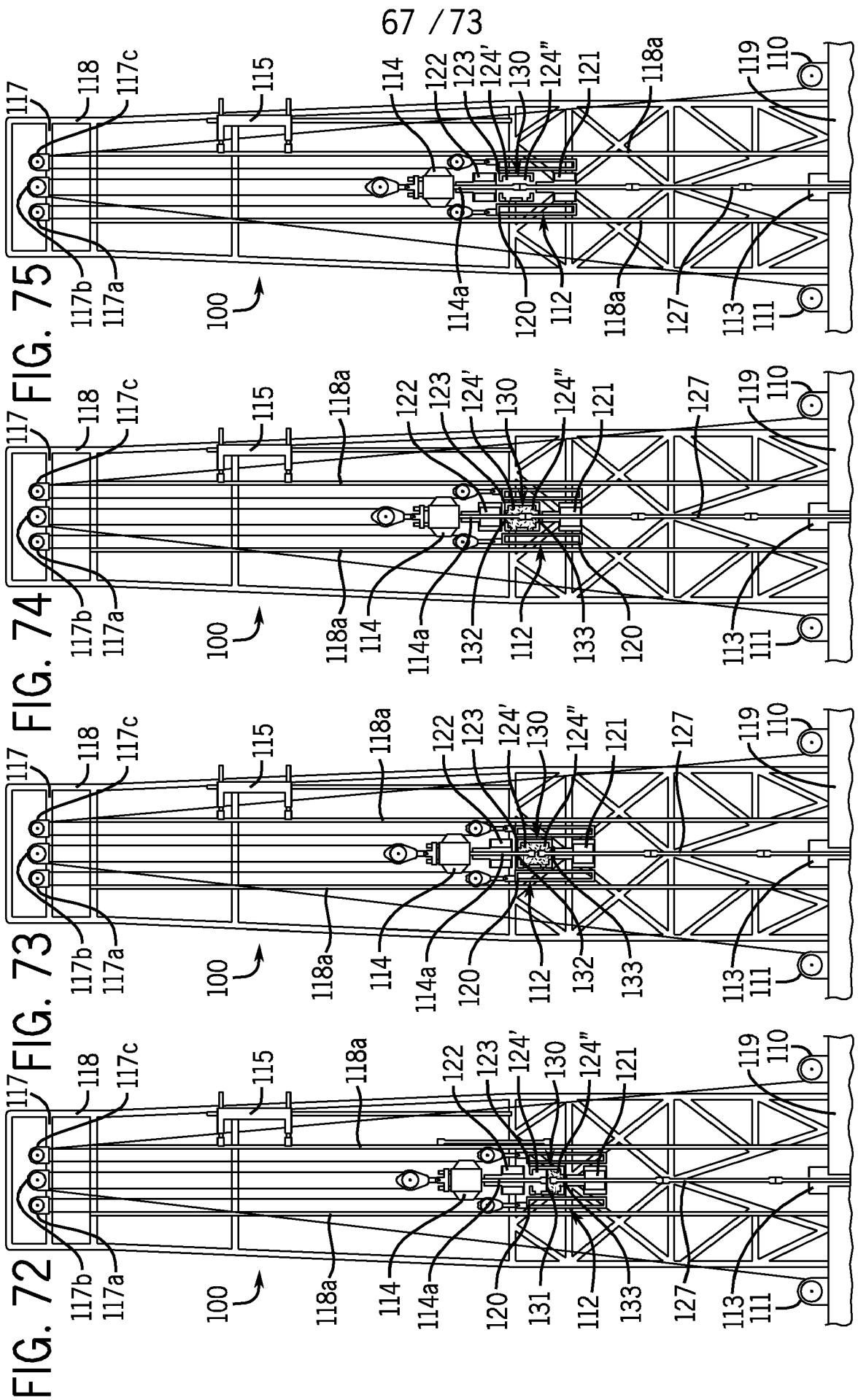


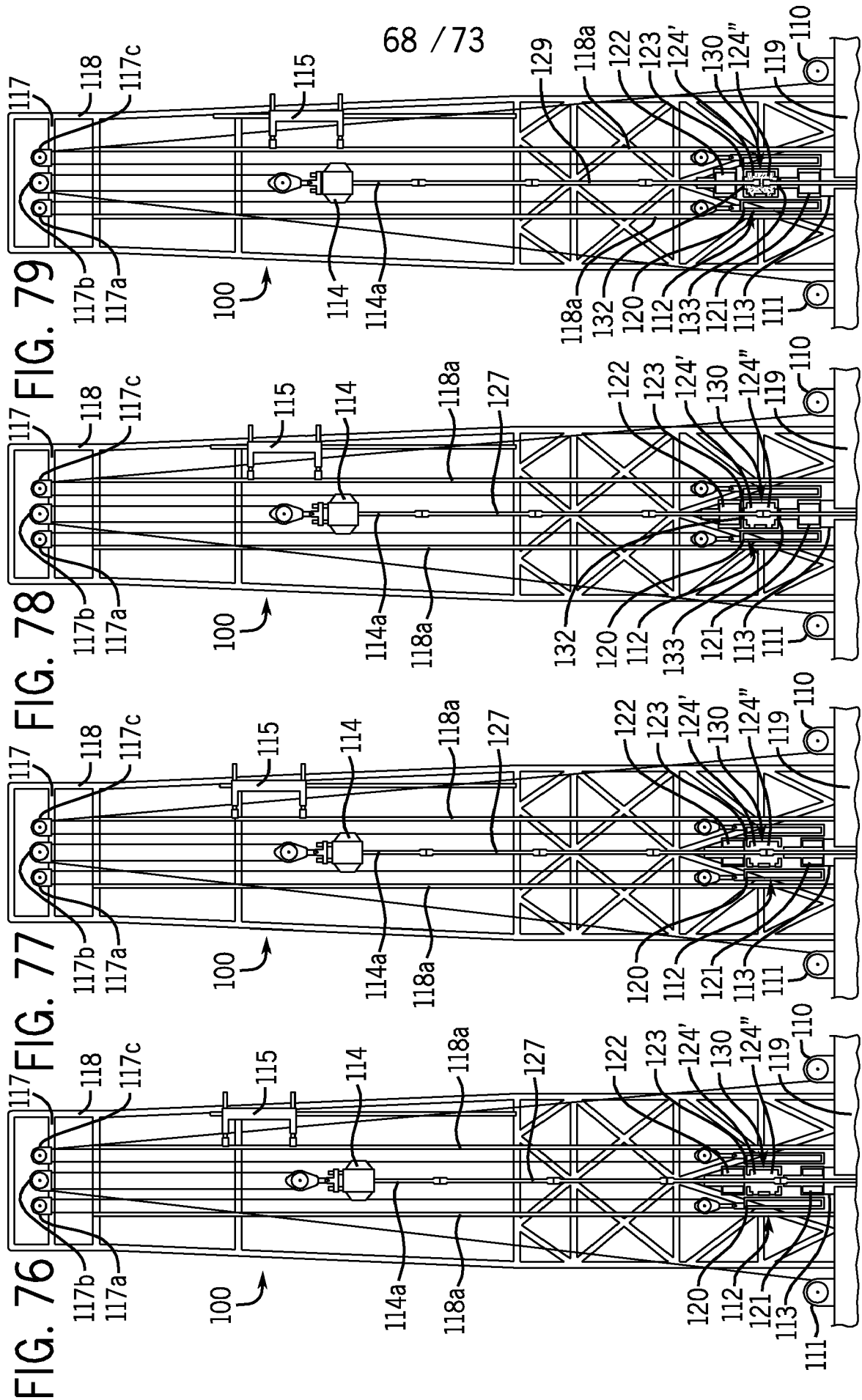
FIG. 59

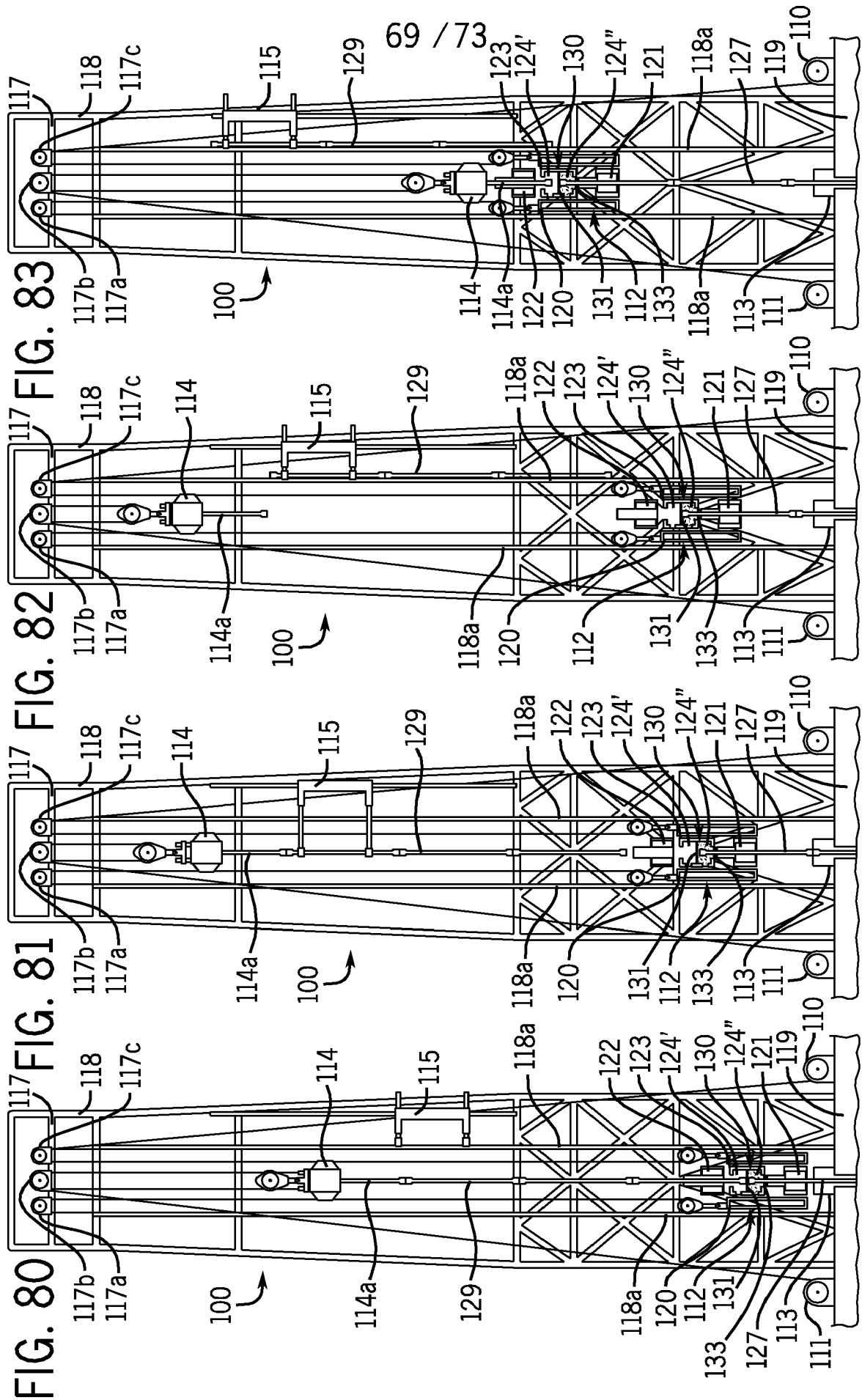


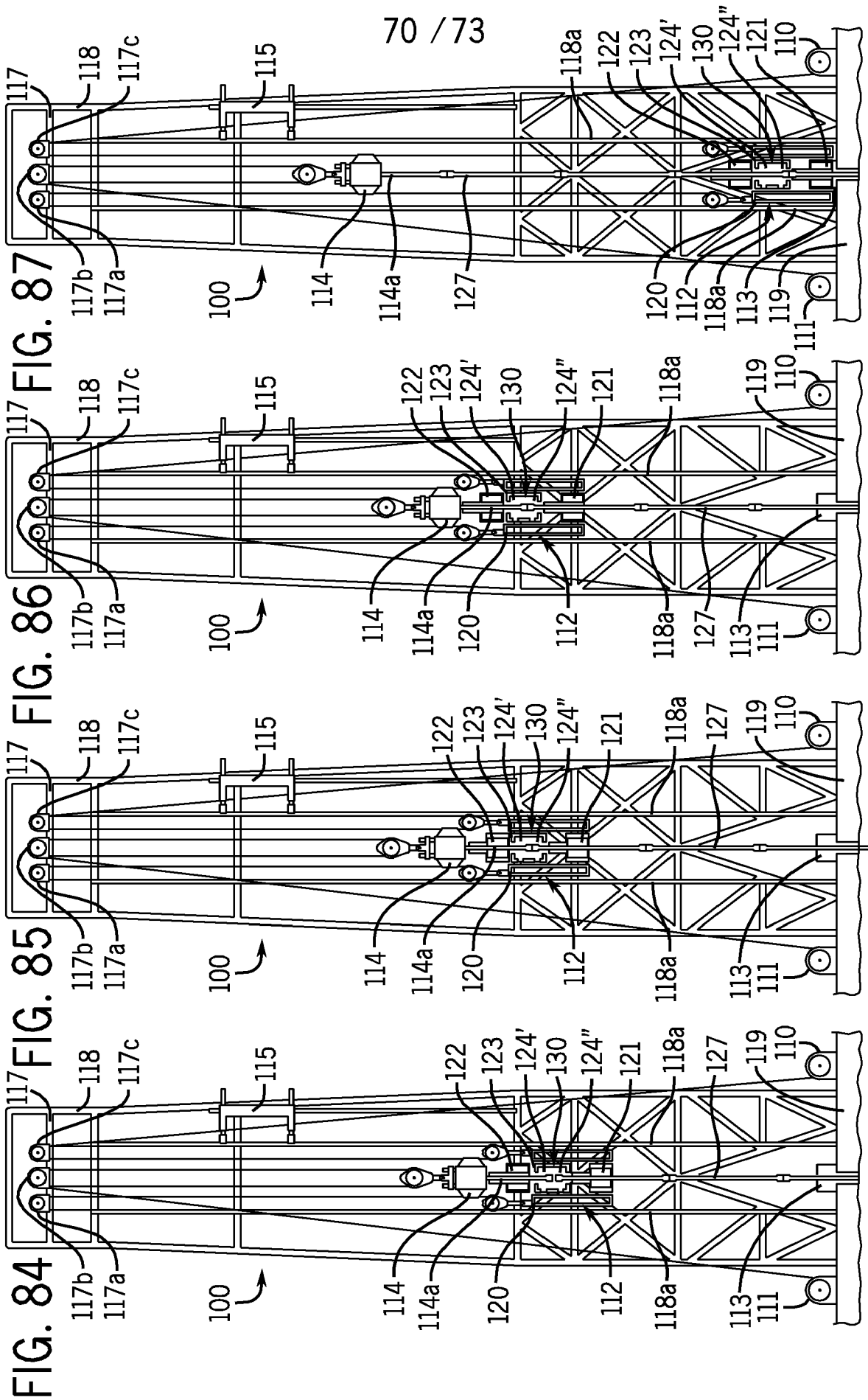


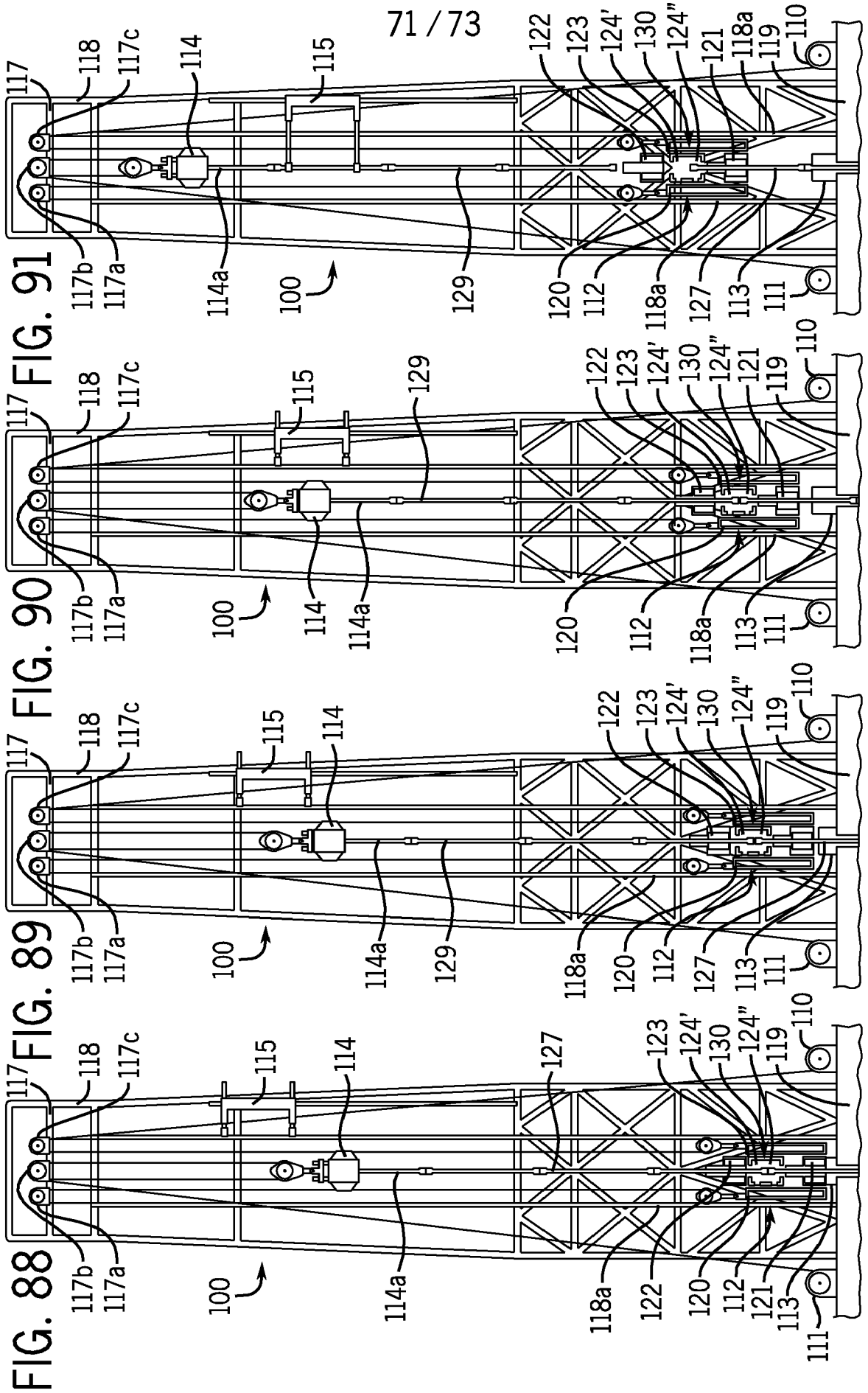




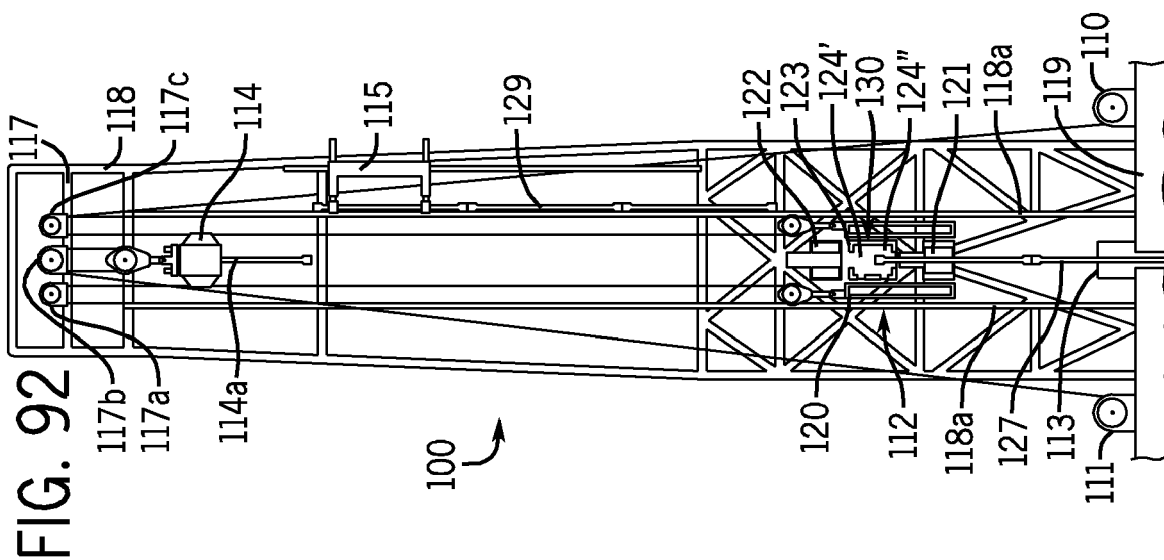
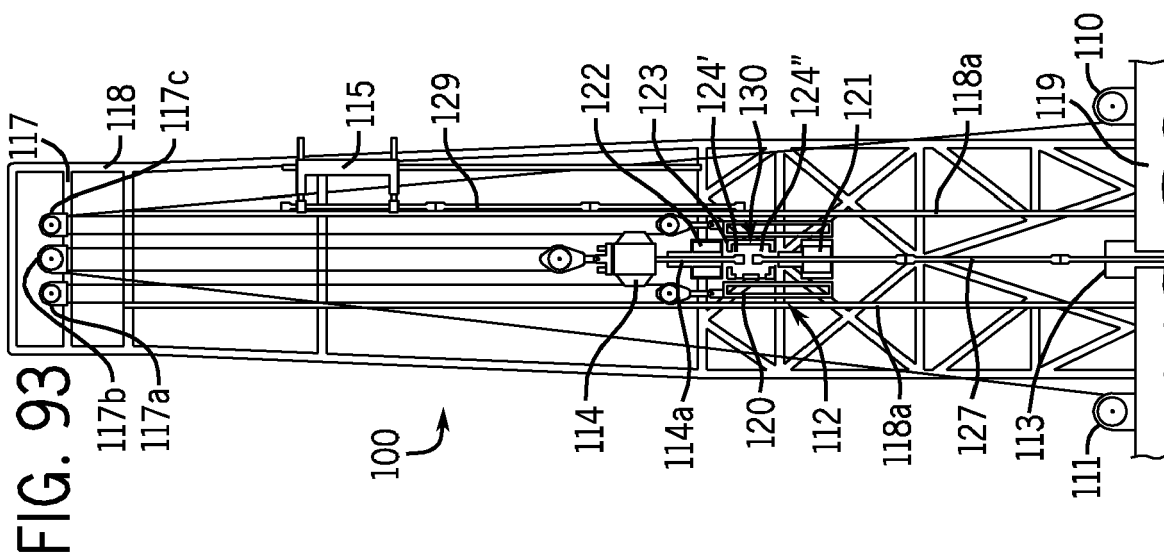








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