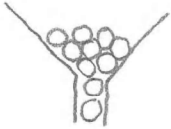
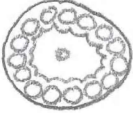

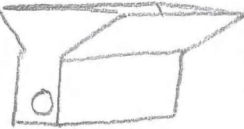
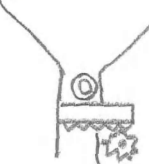

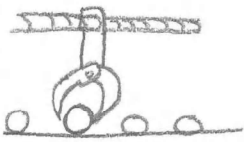
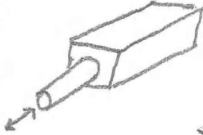
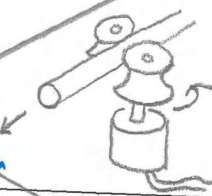

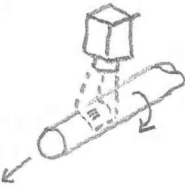
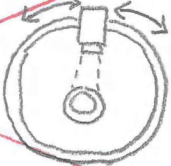
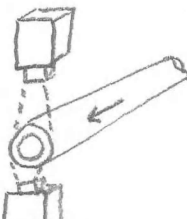
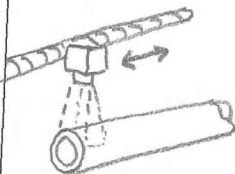
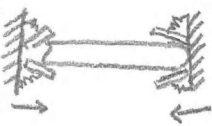
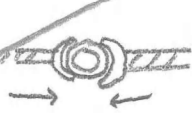
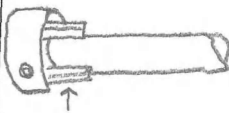

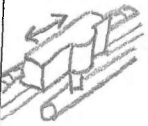
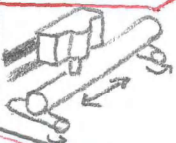
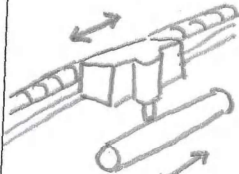
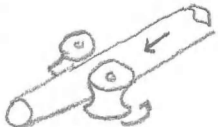
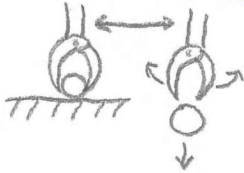
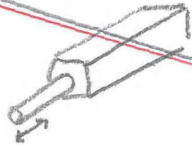



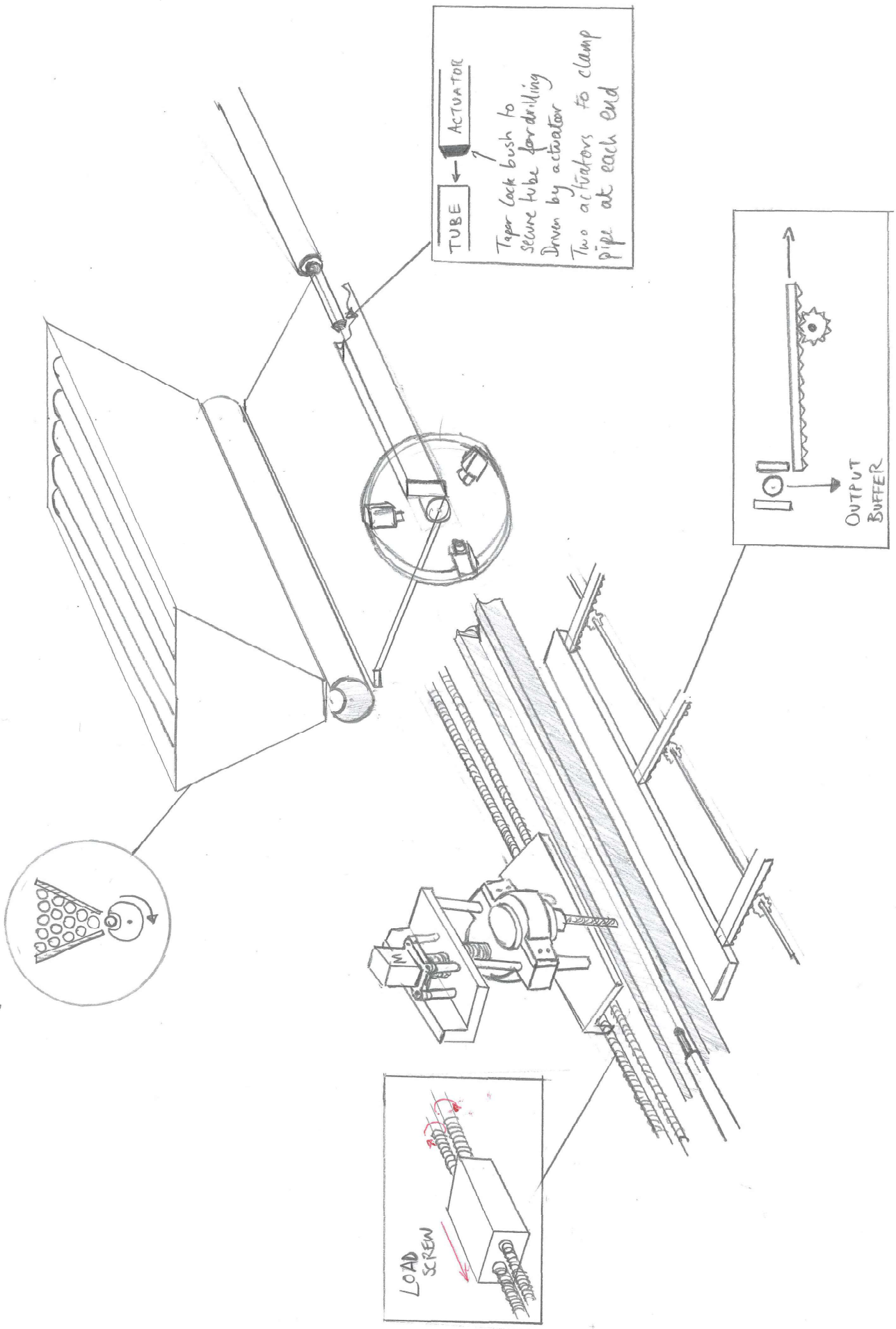
Hole drilling machine design – Morphological Chart

— Concept 1

— Concept 2

— Concept 3

Function	Concepts			
Tube Storage	V shaped funnel 	Drum 	Cuboid bar storage 	
Mechanism to select Individual Tube	Circular Opening 	Slot opening 	Rotating cylinder with pipe slot 	Claw Mechanism 
Mechanism to move pipe to drilling station	Actuator 	Motorised Rollers 	Conveyor belt 	
Locate and Read 3D barcode	Rotate Tube 	Rotating Barcode Scanner 	Multiple scanner system 	Linear Moving Scanner 
Grip Tube	End clamp plates with sprung tapers 	Side clamp plates 	Jaw scroll chuck 	Suction 
Drill accurately spaced holes	Move drill module using x axis gantry 	Move tube linearly under fixed drill 	 Moving Tube and drill	
Beam ejection Mechanism	Motorised Rollers 	Claw Mechanism 	Actuator 	Drop onto inclined ramp 



Concept 2

