

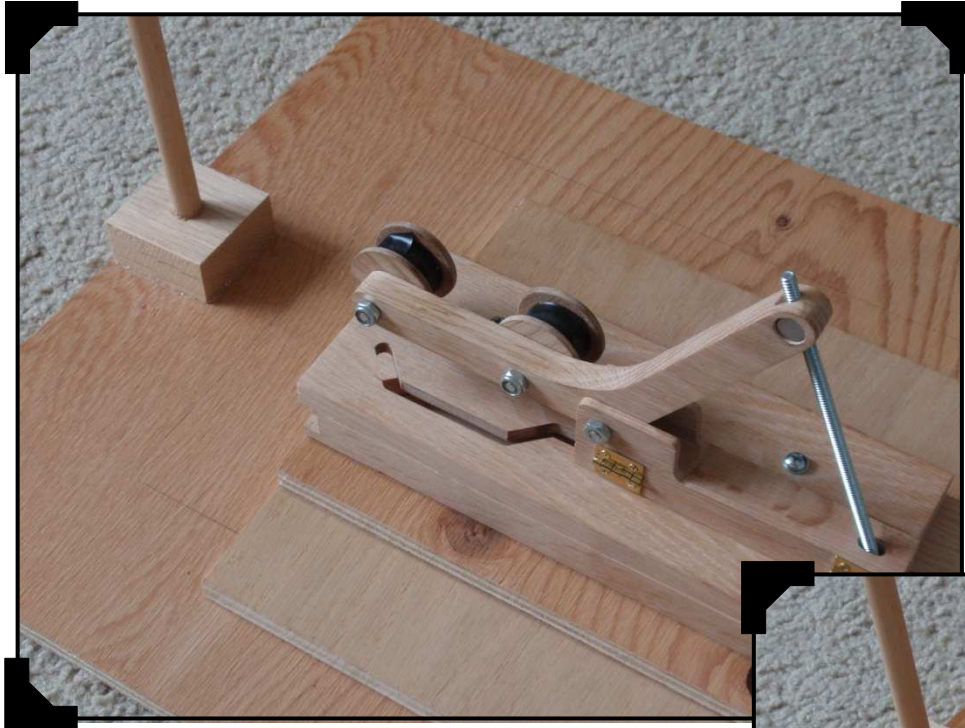


**2010 Bear Metal
“Climber” Design**



The Bear Metal “climber” prototype.

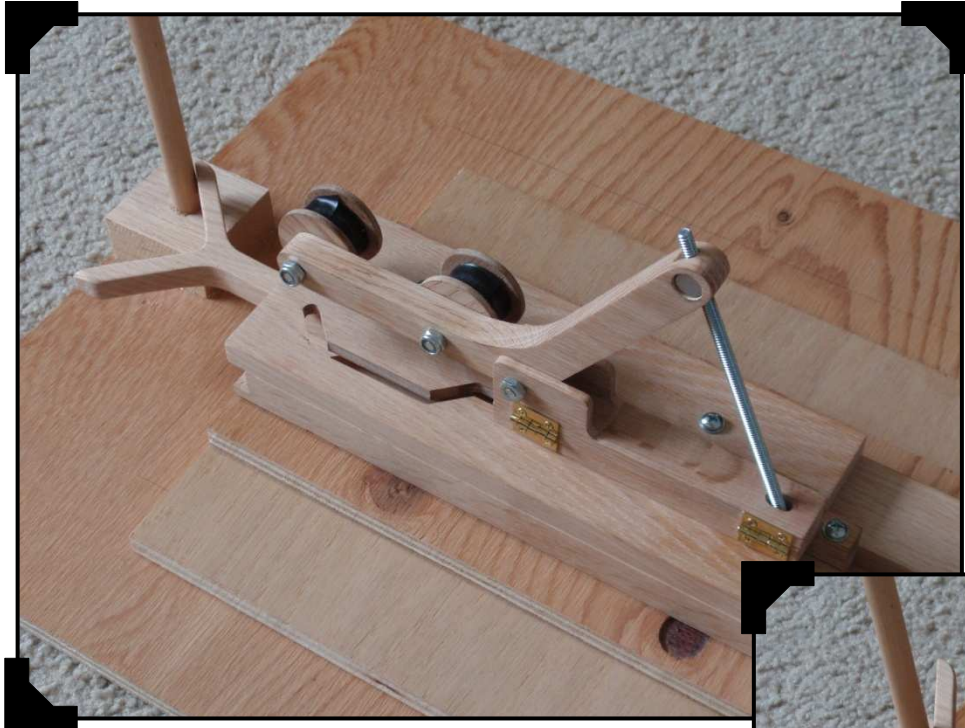
(NOTE: Portions of the robot not associated with climbing were not prototyped.)



As the robot approaches one of the tower poles...

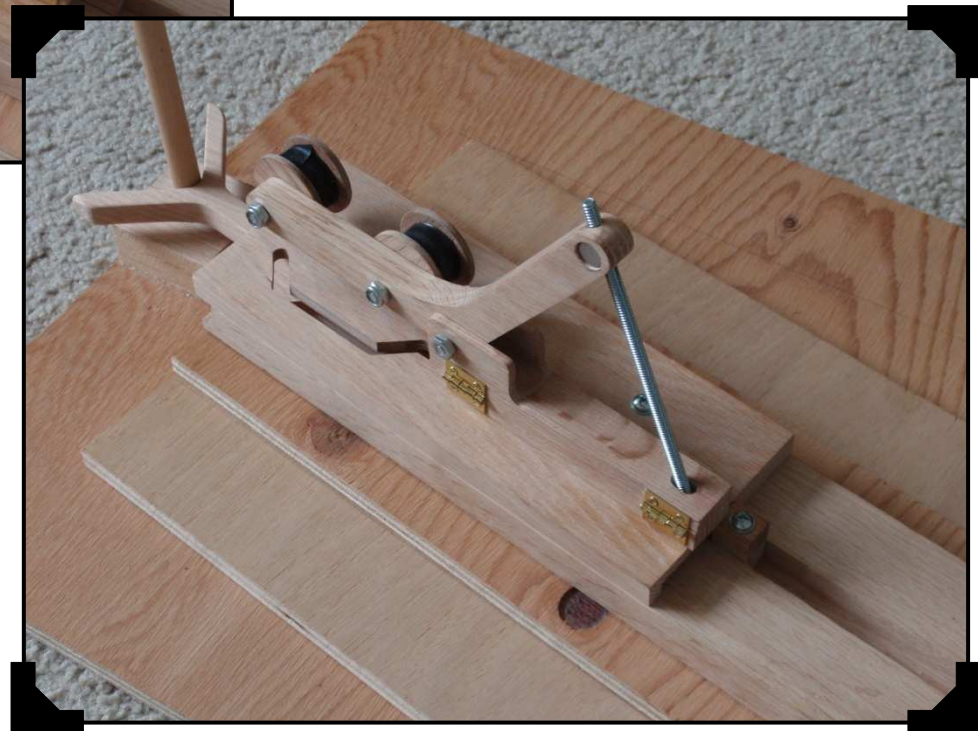


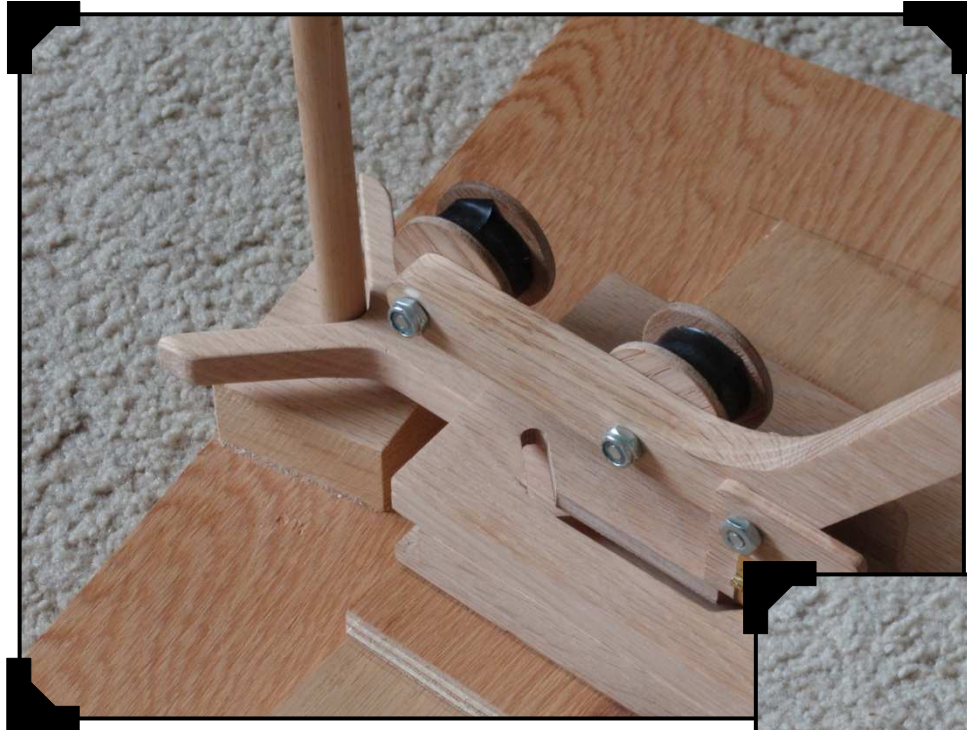
...it deploys its climbing alignment fork, and locks the fork in place.



The robot continues toward the tower pole, contacting the pole with the alignment fork.

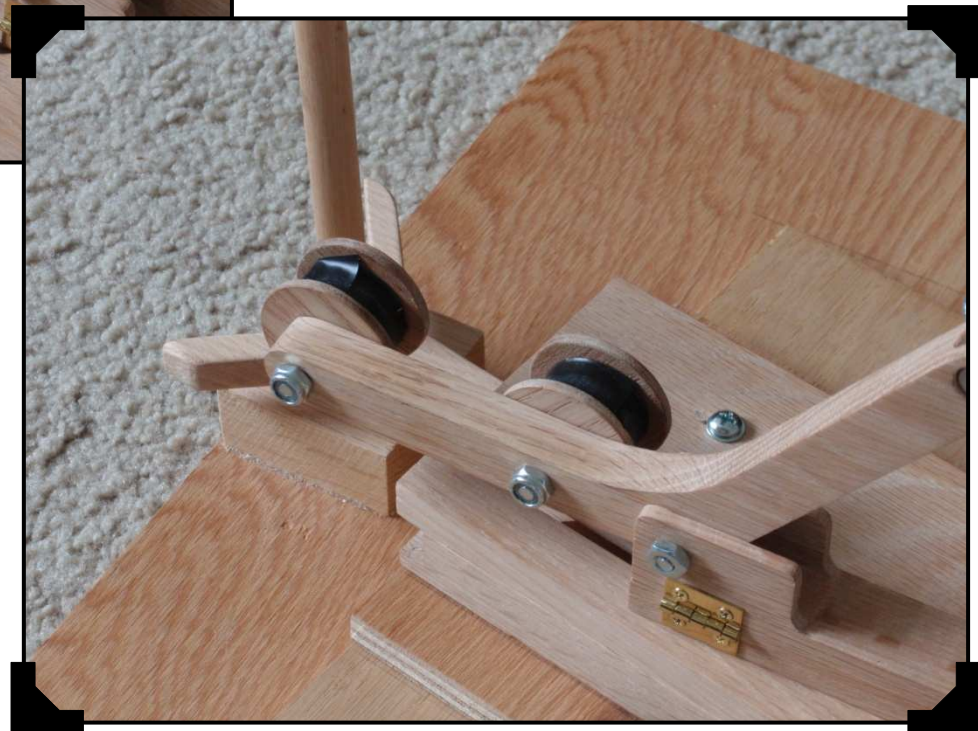
As the robot moves forward, the alignment fork slides the robot laterally, centering the tower pole in front of the climbing mechanism and holding it the appropriate distance from the climber.

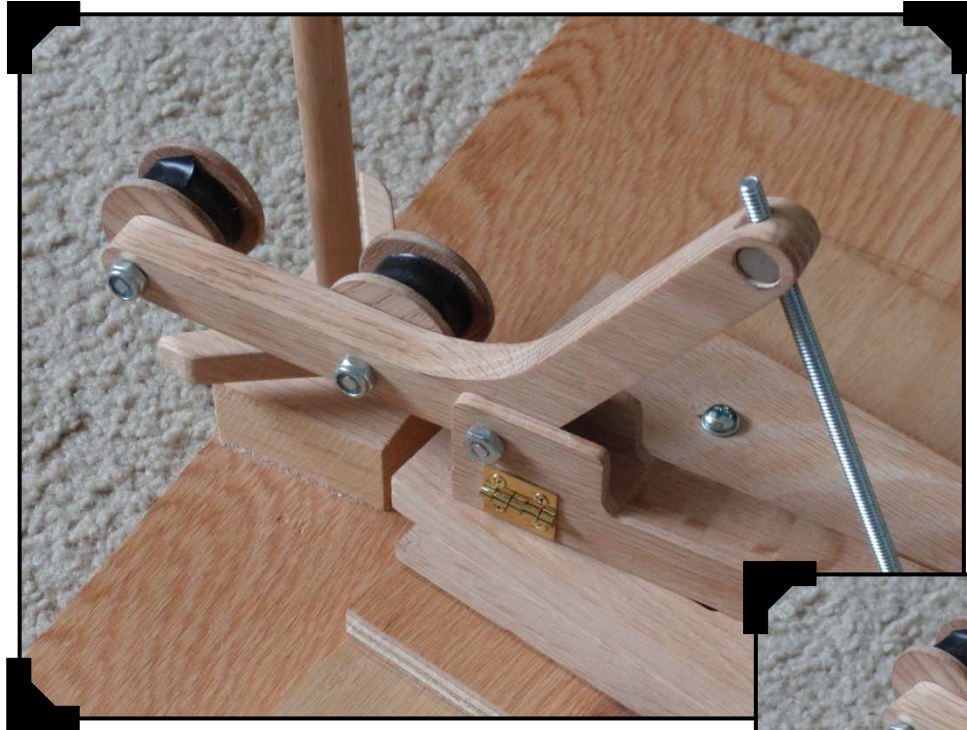




The robot begins to deploy its climbing arm by pushing it forward. The channel beneath the climbing arm automatically steers the arm around the tower pole.

Here, the climbing arm is shown as it navigates its way around the tower pole.





The climbing arm continues to navigate its way around the tower pole.



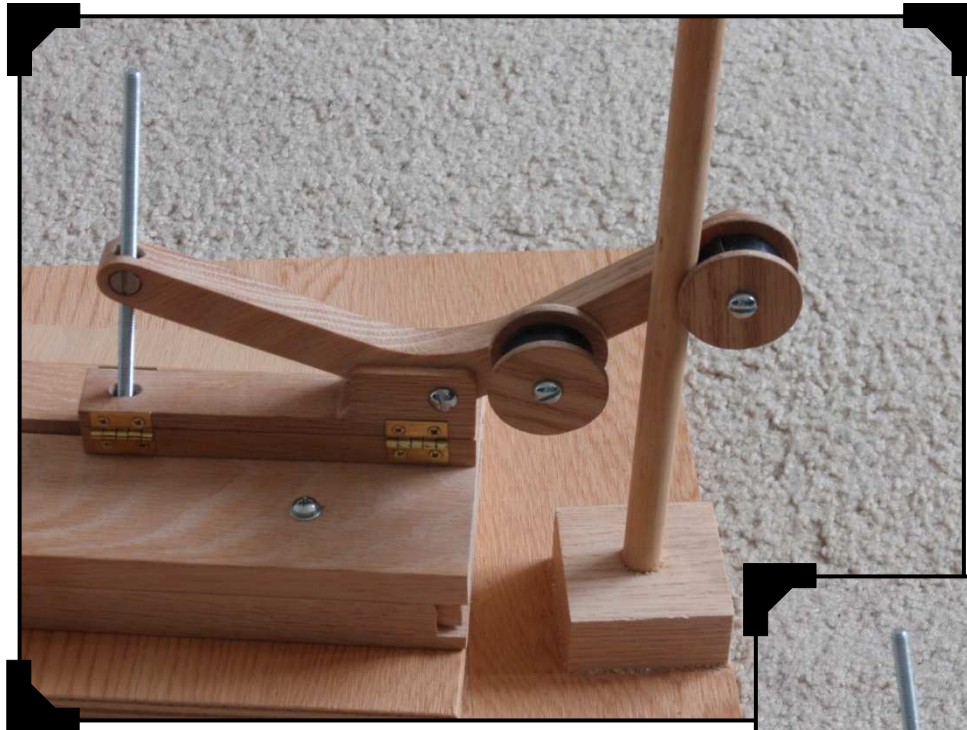
The climbing arm, shown fully deployed and centered around the tower pole. The alignment fork guarantees a perfect deployment every time.



The alignment fork is then unlocked and withdrawn to avoid interfering with the climber.

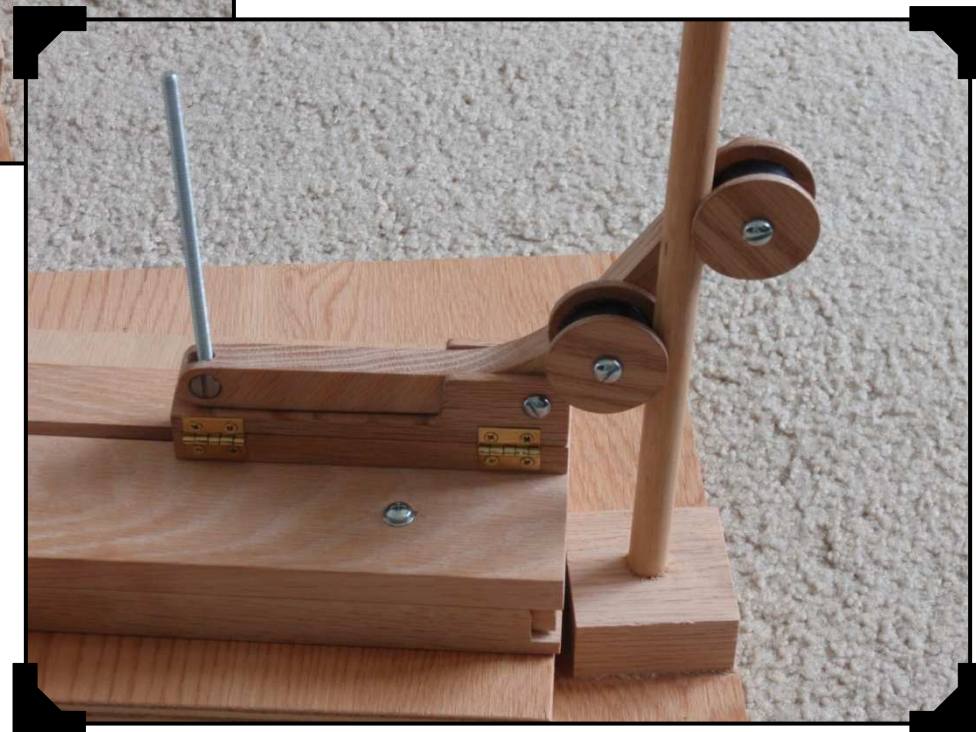
A side view of the climbing arm centered around the tower pole, with the alignment fork withdrawn.

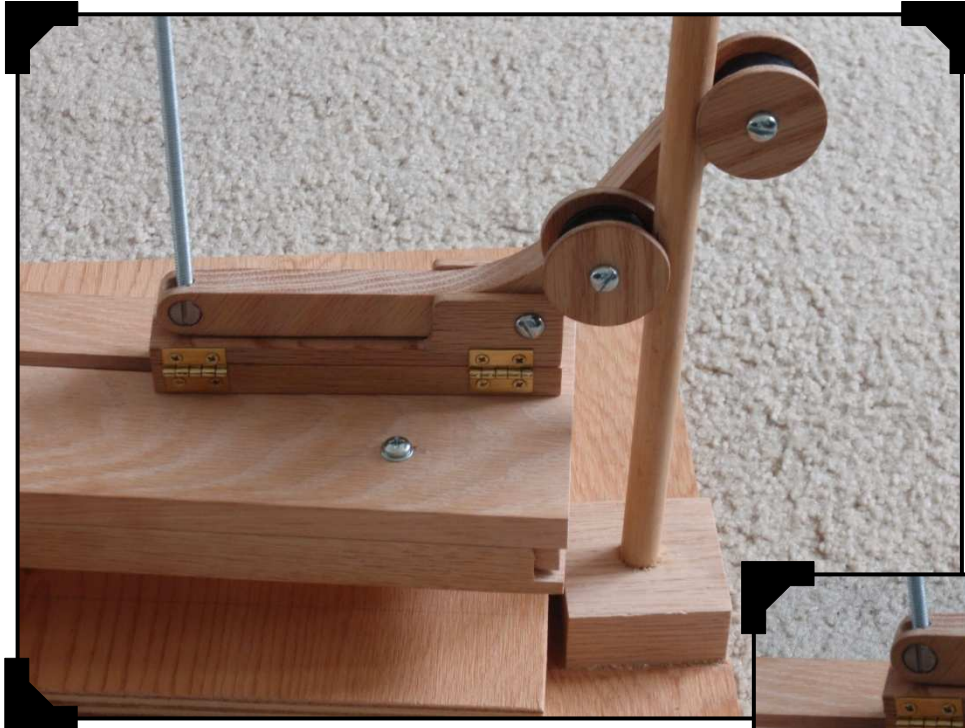




The climbing arm is raised, tightening around the tower pole. In this picture, a drive screw is shown as the tightening mechanism, but if built, the climber would likely have a winch to tighten the climbing wheels around the pole.

As the climbing arm's wheels clinch the tower pole, the robot is drawn closer to the pole. (If the alignment fork were not withdrawn prior to raising the climbing arm, it would cause interference.)





A chain turns both of the wheels in the appropriate direction, raising the robot off the floor. The torque applied to the pole by the weight of the robot keeps the wheels engaged while “climbing” the pole.

The robot, raised completely off the floor. (Note: Once the robot has a tower pole in front of it, the climbing process can be automated, making the time required to climb predictable and repeatable.

