

## CHERRY

Summary (There are 7 pages in all)

CHERRY is a simple solution inspired by the Cherry Picker device, depicted here.

The components are like a human arm. The Support arm (upper arm) hinges around the “shoulder” joint. The picker arm (fore arm) hinges around the “elbow” joint. There is a “hand” at the other end of the picker arm which hinges on a “wrist” joint. A BackHoe’s claw is similar, but then what would I call it?

As designed, all joints swivel in the vertical plane along the center of the robot. All joints have rotary position sensors and use worm drives.

It can hang up to 9' 5" high and allows autonomous mode & minibots. It uses just 3 motors & 3 worm drives, no pneumatics. It uses software to move the hand intelligently and minimize driver workload.

It picks up pieces off the floor like a fork lift. The hand swivels to cradle the game piece more securely so that it doesn't fall off during motion. The robot's maximum horizontal dimension during the game is limited to 60" (original requirement).

This is just is a rough design and you would need to innovate a lot more, like:

- mount the camera on the hand,
- rotate the whole arm assembly on a horizontal lazy susan,
- attach a platform and use the support arm to deploy minibots,
- ...

Have fun...

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### Notes:

Game piece cross-section radius = 4"

Fork prong length = 6" (should be greater than radius)

Max arm extension length =  $60" - 6 \times 0.7" = 55"$  (avoid exceeding 60" rule.)

Max robot height = 60"

Shoulder mechanism allowance = 2"

Max shoulder height = 58"

Max prong height =  $58" + 55" = 9' 5"$



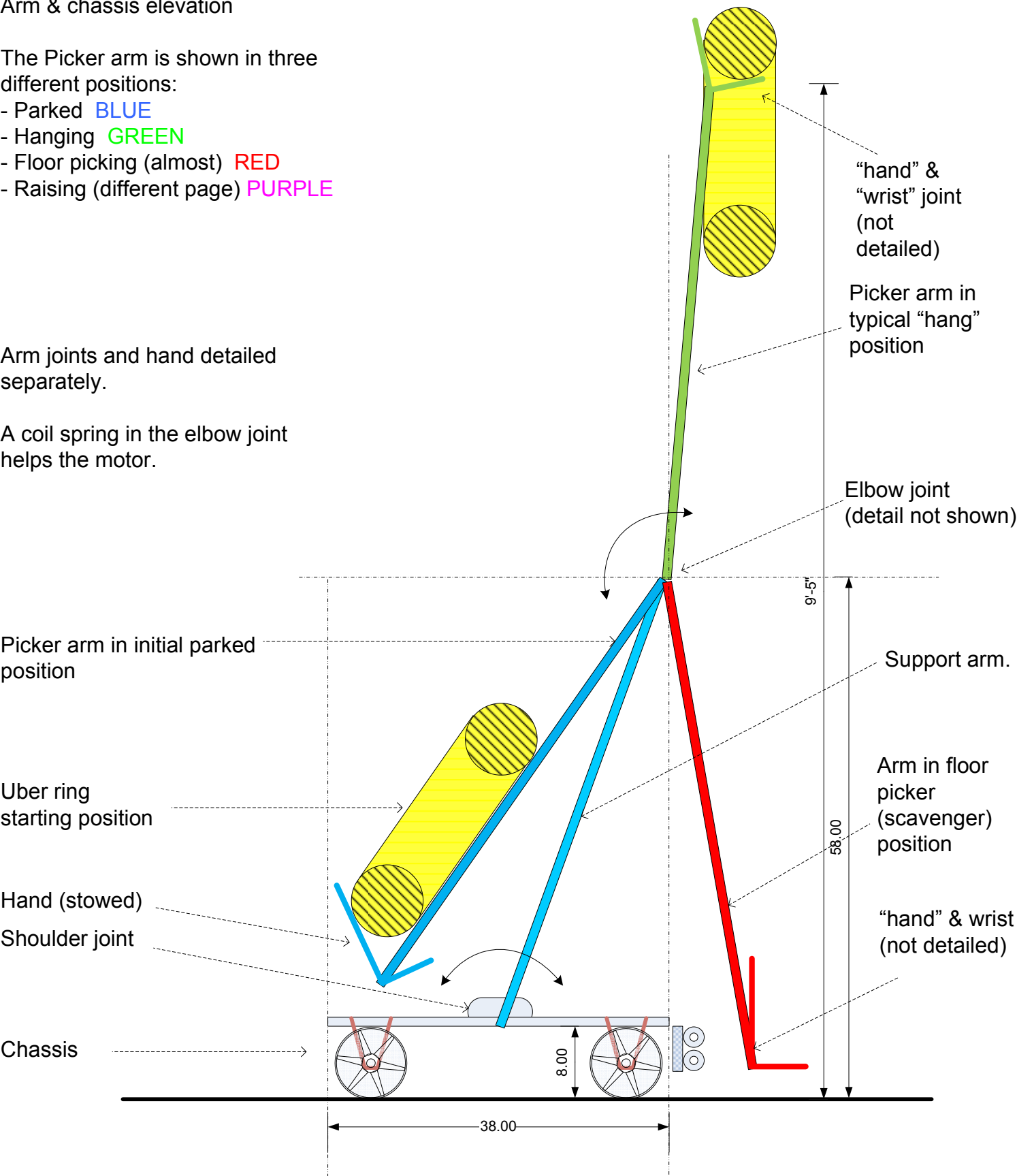
CHERRY  
Arm & chassis elevation

The Picker arm is shown in three different positions:

- Parked BLUE
- Hanging GREEN
- Floor picking (almost) RED
- Raising (different page) PURPLE

Arm joints and hand detailed separately.

A coil spring in the elbow joint helps the motor.



CHERRY  
Side & front elevation  
In hanging position

Max height  
achieved  
when both  
arms are in a  
straight line

9'-5"

58.00

8.00

38.00

60.00

Wrist worm  
drive

Hand

Picker  
arm

Elbow motor  
and worm  
drive

Flexible  
drive cable

Wrist motor

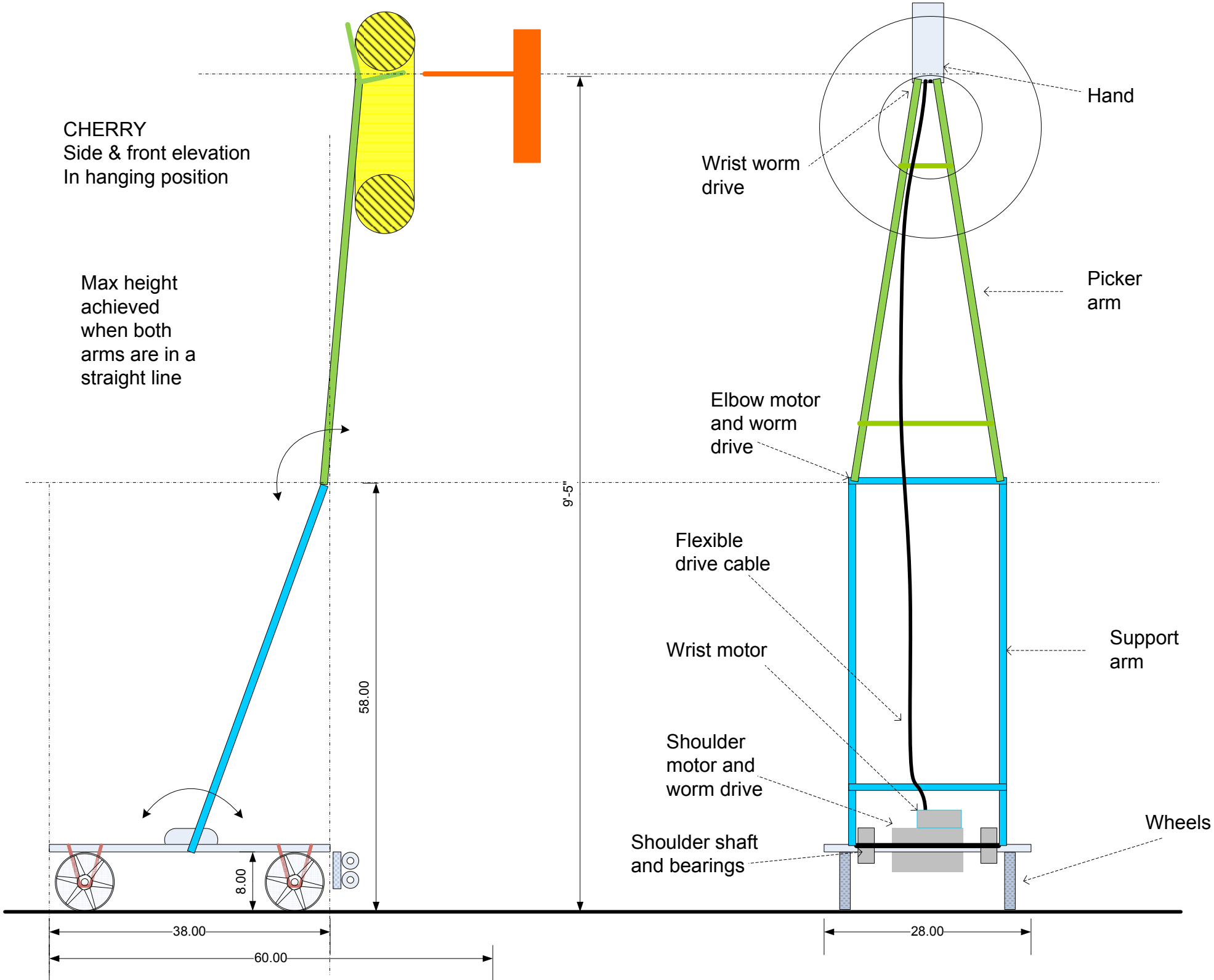
Support  
arm

Shoulder  
motor and  
worm drive

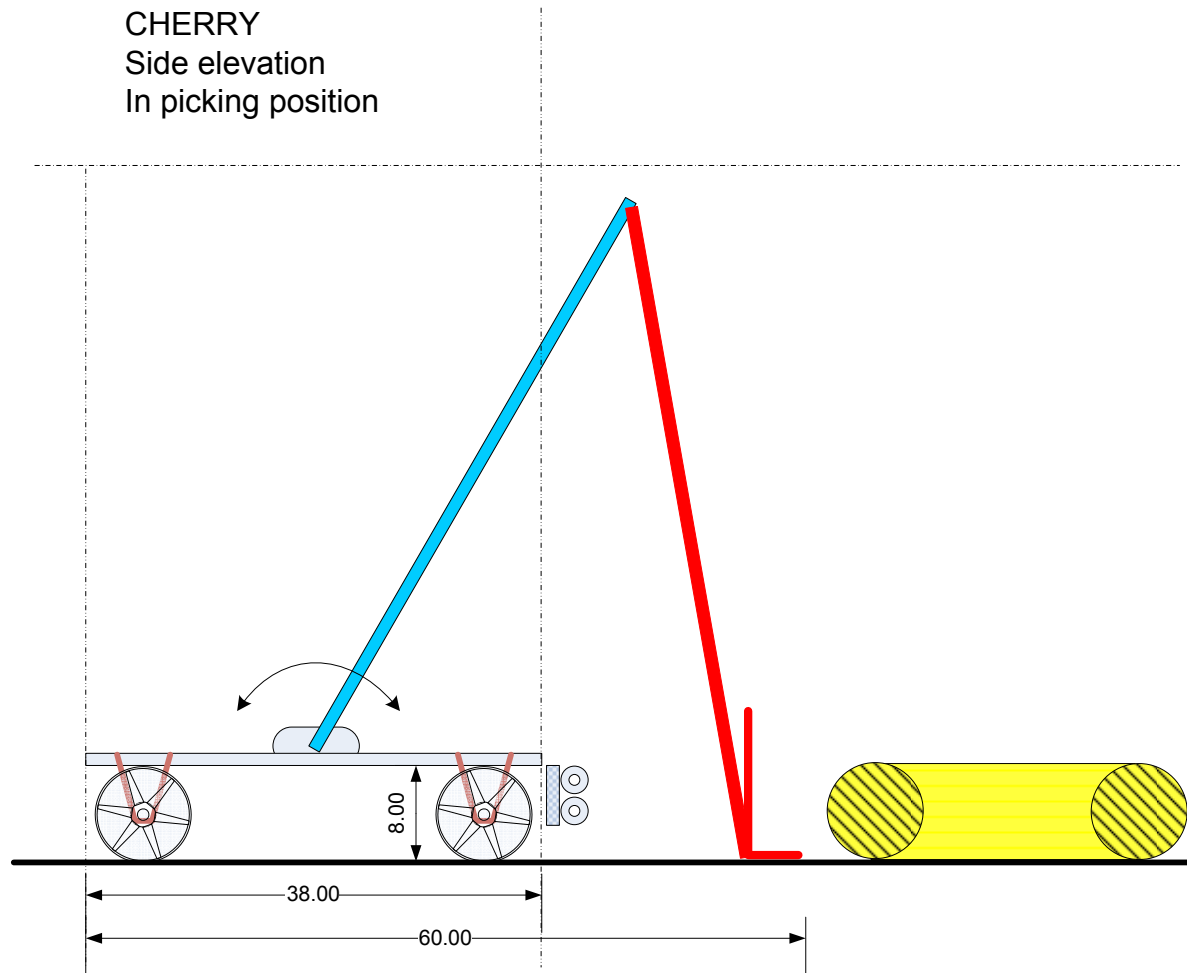
Shoulder shaft  
and bearings

Wheels

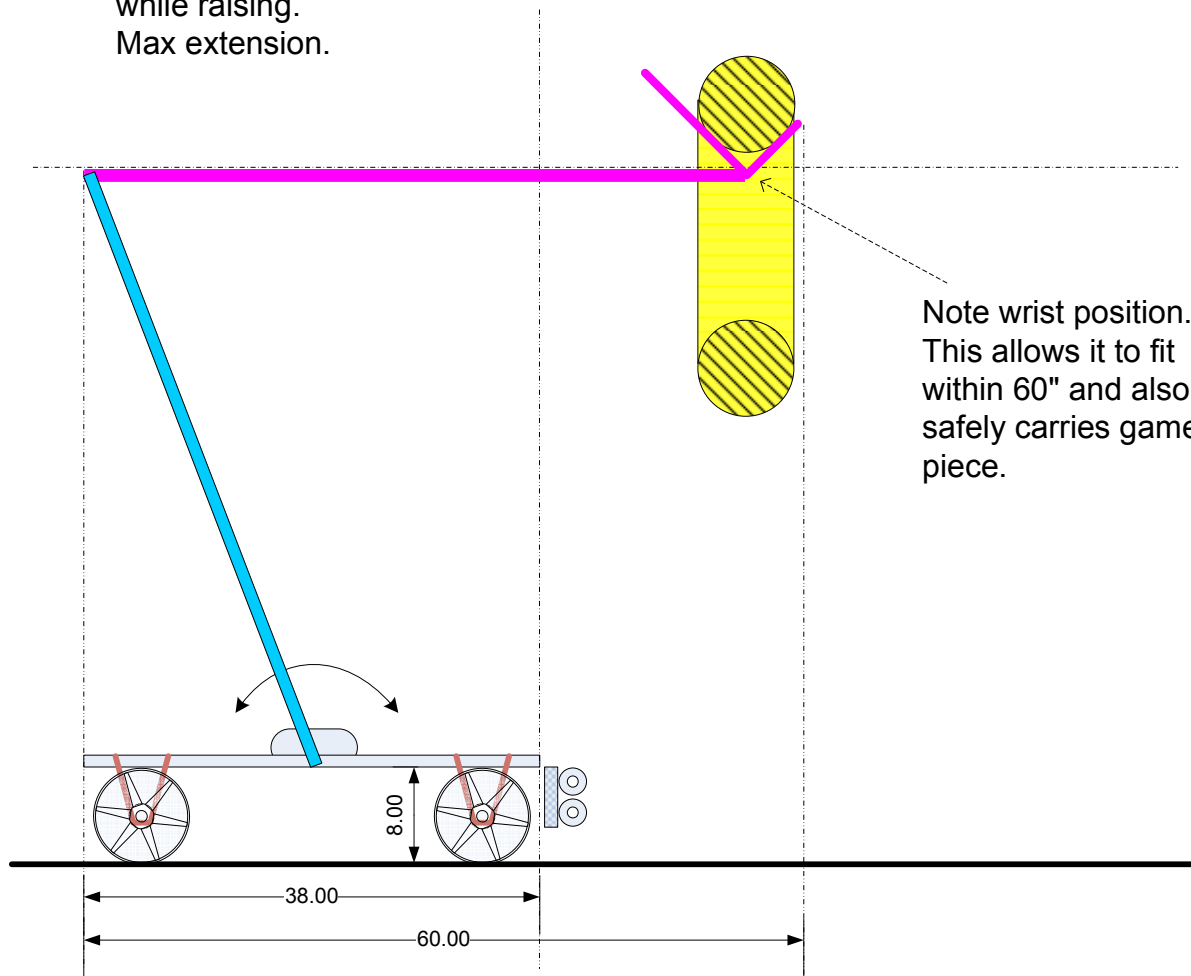
28.00



CHERRY  
Side elevation  
In picking position

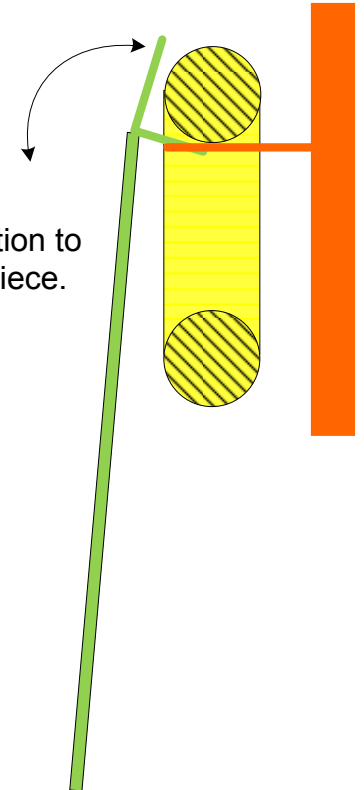


CHERRY  
Side elevation  
while raising.  
Max extension.

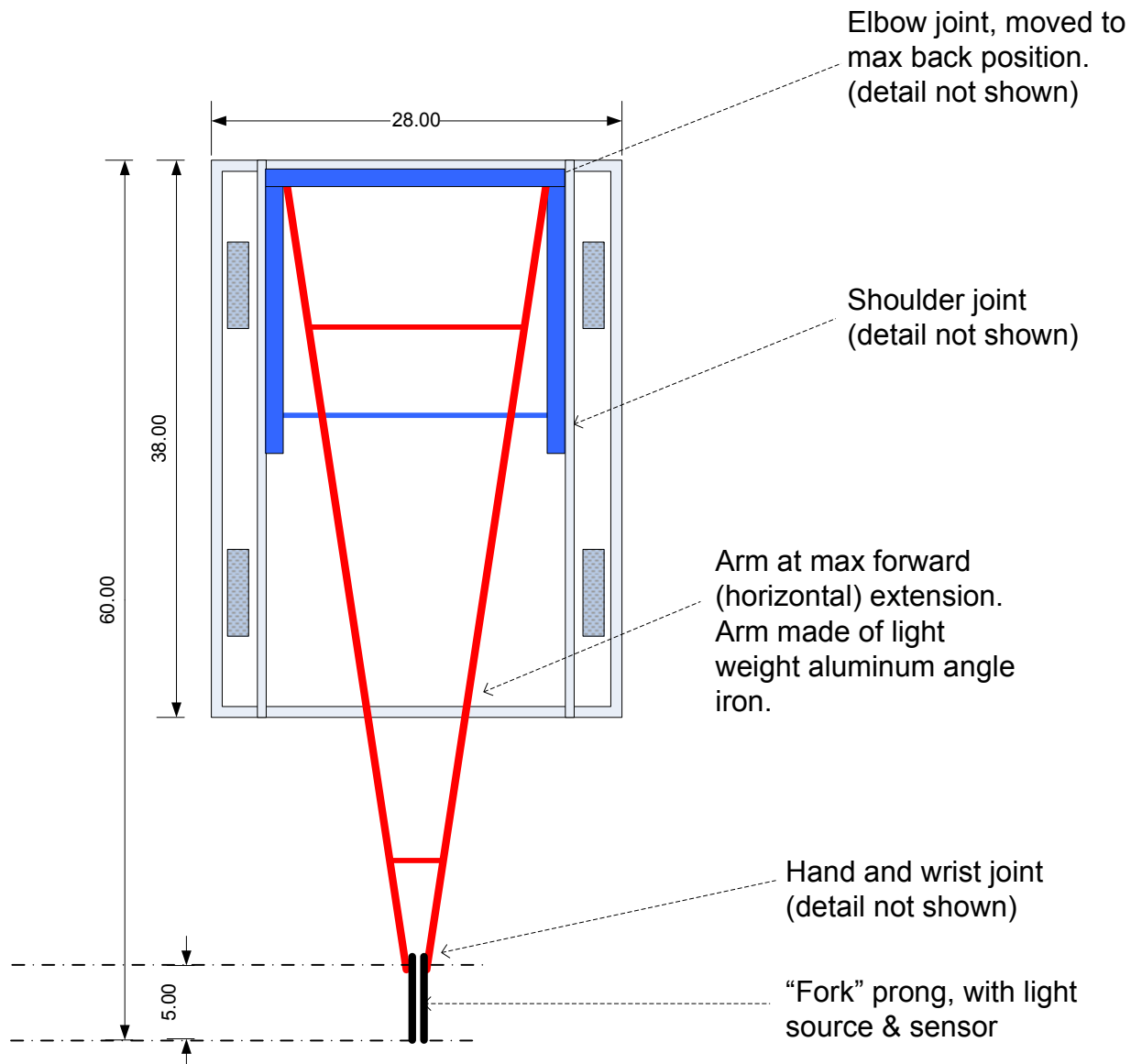


Note wrist position.  
This allows it to fit  
within 60" and also  
safely carries game  
piece.

Hanging.  
Wrist motion to  
release piece.



CHERRY  
Arm & Chassis plan  
While raising



CHERRY  
Hand & wrist joint.  
Side & front elevations

