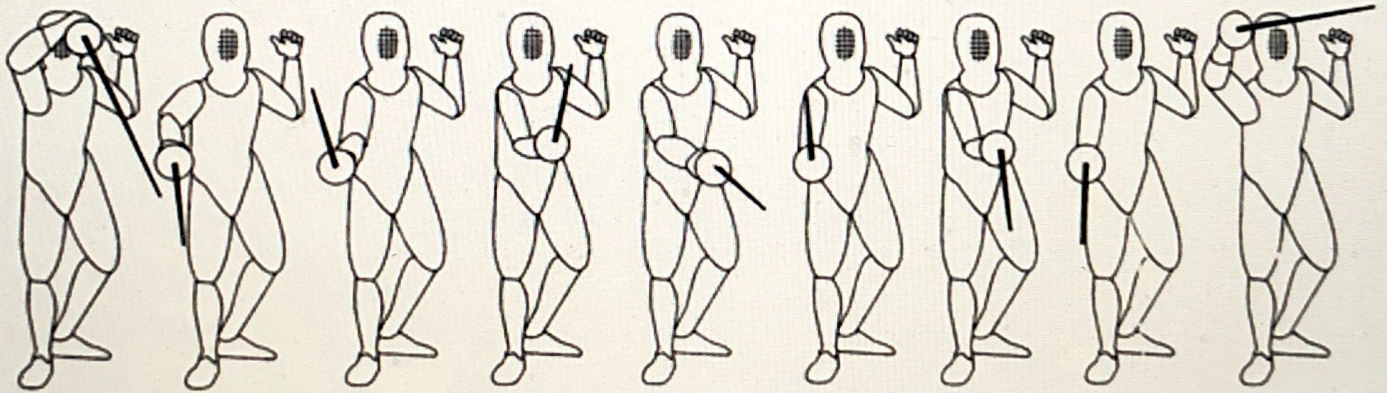
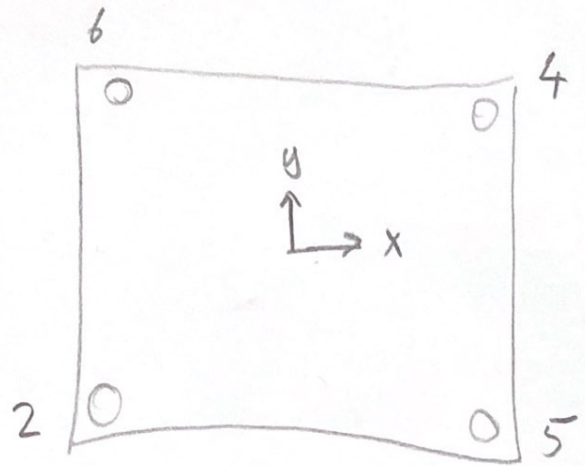


1st 2nd 3rd 4th 5th 6th 7th 8th 9th



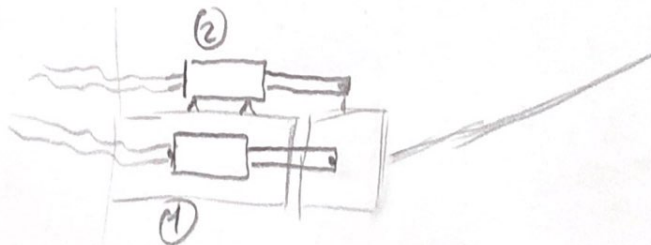
Pronation Prime *Pronation Seconde* *Pronation Tierce* *Quarte* *Pronation Quinte* *Sixte* *Septime* *Octave* *Neuvieme*

As it can be seen in the fig. parry 2, 4, 5, 6 are "touching" the 4 corners of a square.



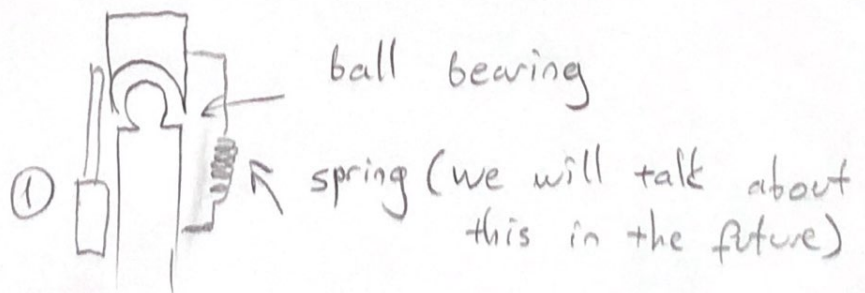
The tip of the foil determines the number of the parry. We only need to move the blade in 2 direction to achieve this.

side view to show syringes

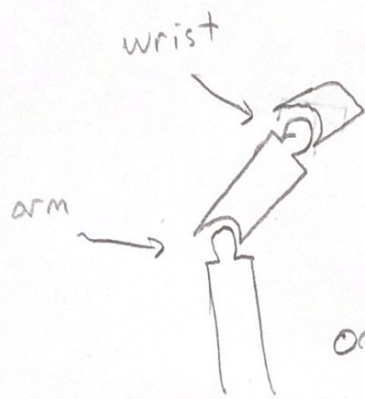


syringe ① contract and extend in order to move in x direction. Syringe ② c. and e. in order to move in y direction.

top view



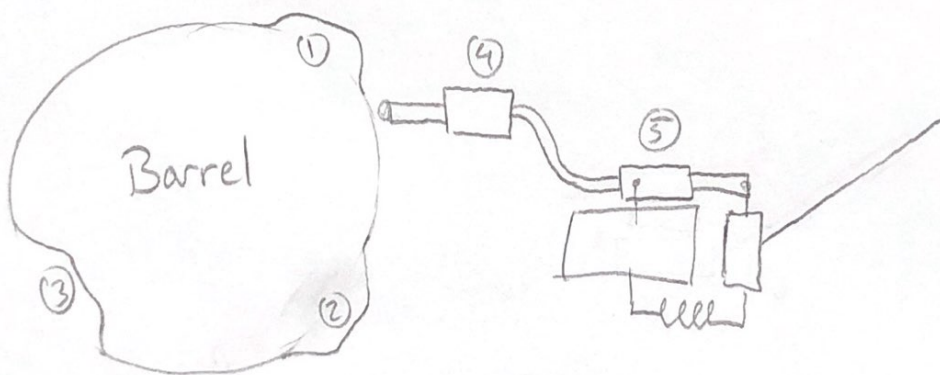
Potential Improvement (If the prof/TA thinks it's not enough to only have a wrist motion)



We can add an arm motion by using the same system.

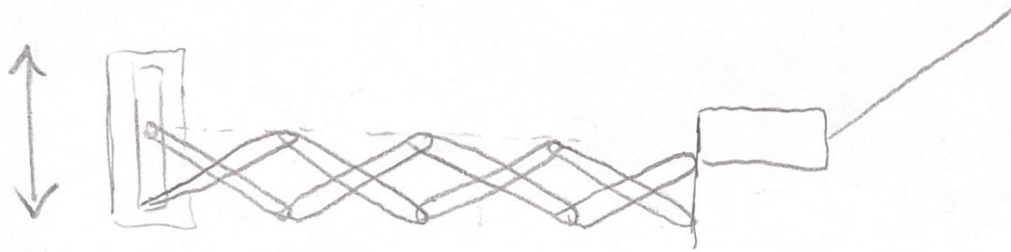
only if the prof/TA wants this!

Bot Bora, how are we going to control these syringes?
Let me show you.



The barrel turns if ① hits the syringe ④, ④ will contract and therefore ⑤ will extend (you know how syringes work). The foil will move down. If it hits number ③ the foil will go up because the spring applying pressure from the other side (Remember the spring?)

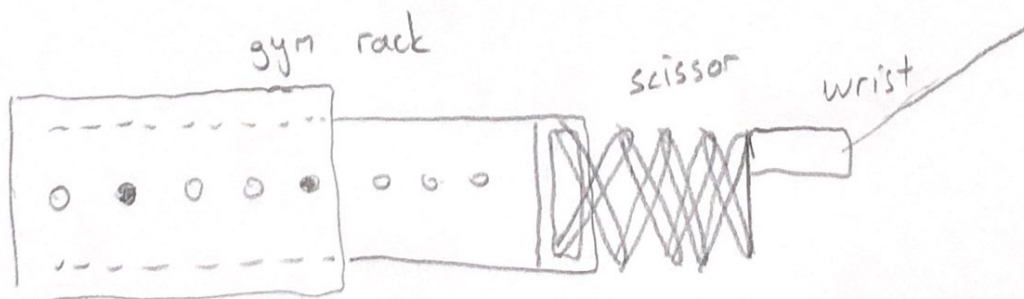
Now we can make all of the parries but how is this barrel works? Well before looking that, let's solve the lunge thing real quick.



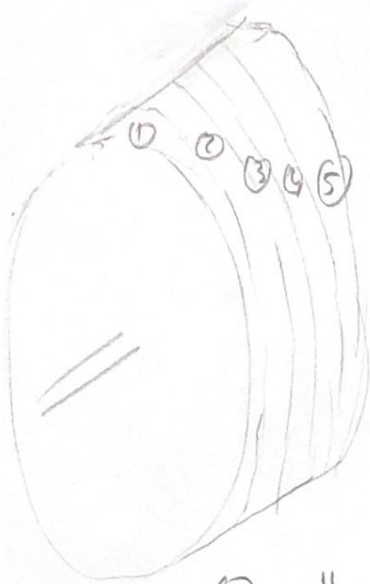
A simple scissor arm will solve the lunge system. It can be driven by an electric motor, or with the same syringes.

I know all of you want to know how the barrel works but one more thing before looking that.

Reach adjustment



Now we solved the complete arm problem, and we are ready to look the barrel system!



this cylinder consist of 5 plates. Each plate drives 1 of the sub-system.

① is for moving the wrist (left-right)

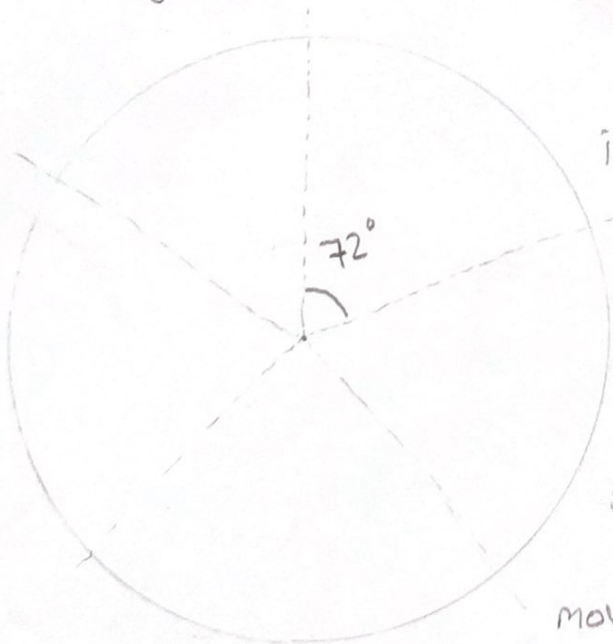
② " " " " " (up-down)

③ is for the scissor arm (lunge)

④ will trigger a contact switch to make 1 forward step

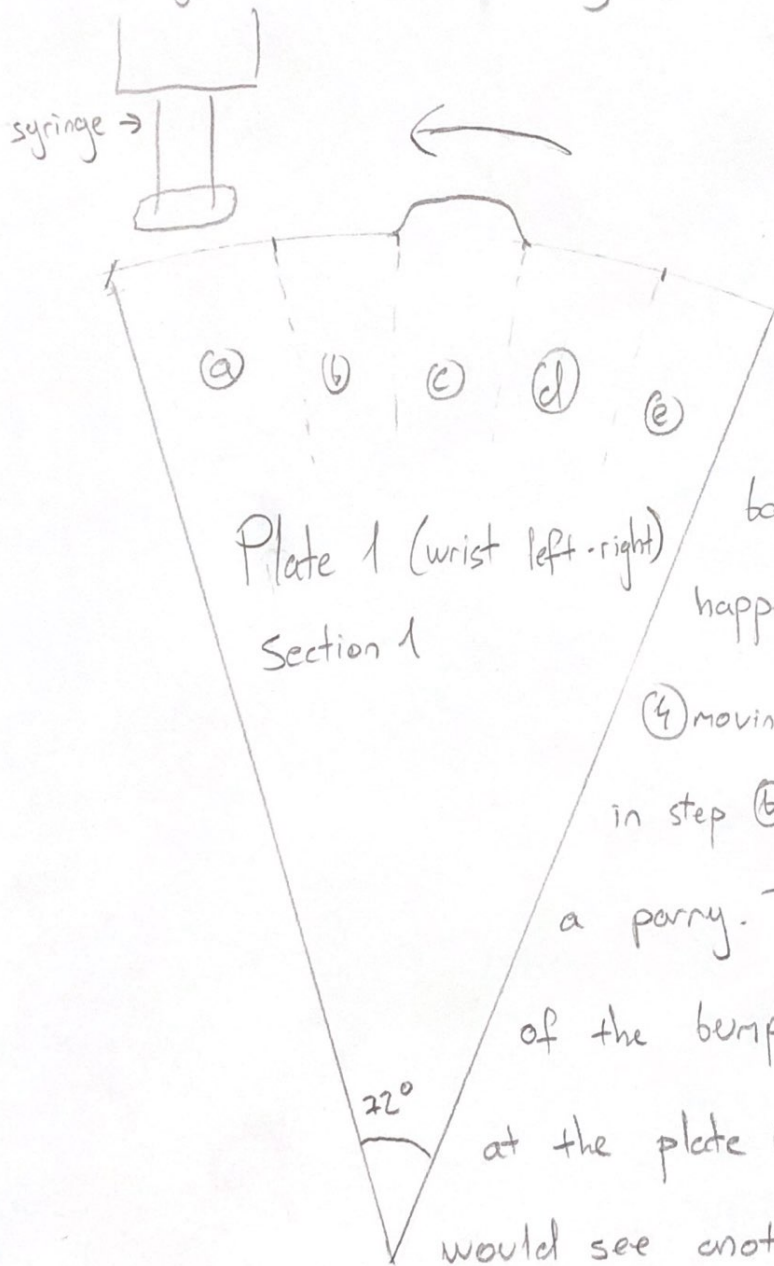
⑤ " " " " " " " " 1 backward "

Let's investigate 1 plate



We have 5 sections in each plate i.e. 5 attack sequence. Each section (72°) corresponds to 1 attack sequence. And we have 5 moves in one attack

(Why always 5? I'dk maybe it because Siobhan's lucky number, you know it's so easy to count 5, 10, 15 so satisfying...)



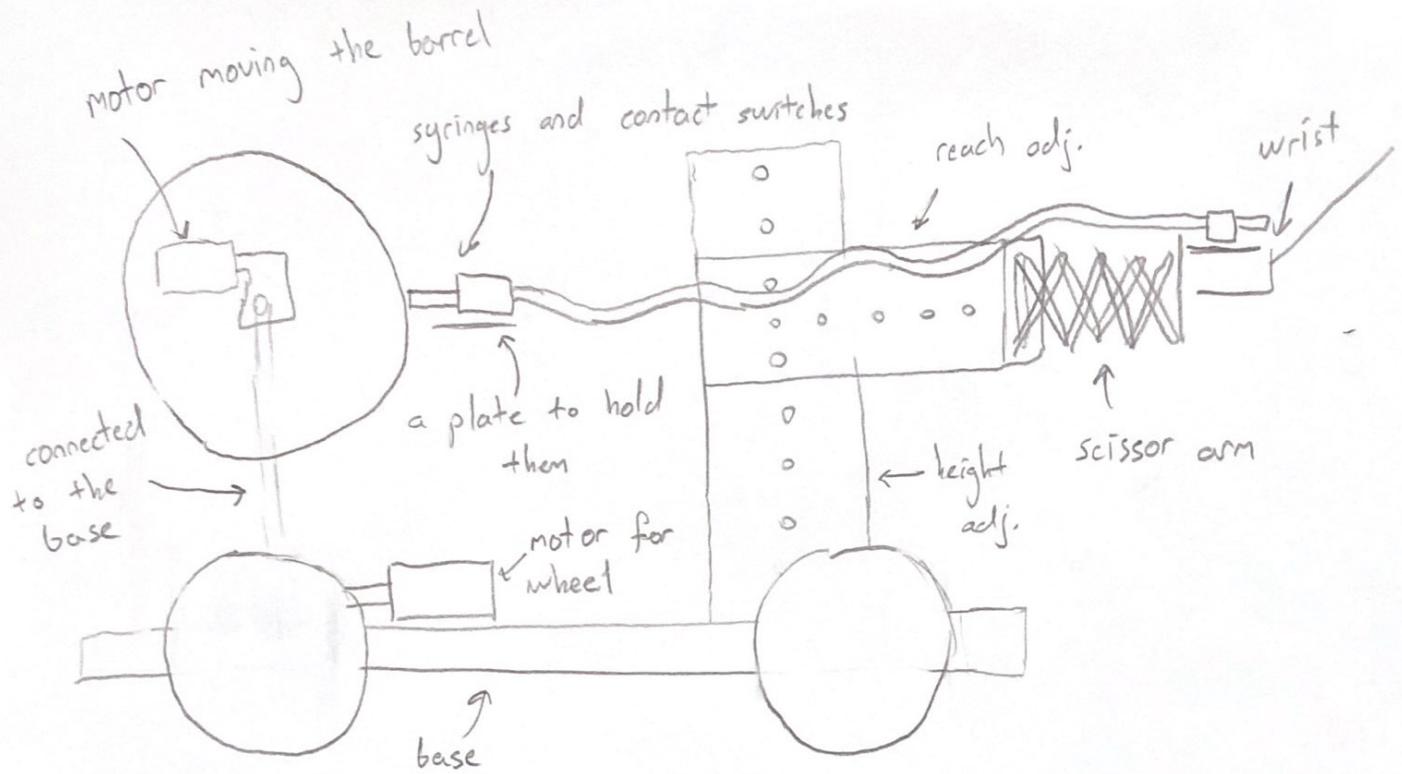
the fig. is enlarged version of the first attack sequence of the plate ①.

barrel is turning, nothing happens in step (a). (Plate ④ moving in that step). Nothing happens in step (b). In step (c) we are making a parry. The wrist turns left because of the bump in the fig. If you look at the plate ② in the same time, you would see another bump in step (c) which

will lower the arm. This is how we are doing the parry 2! (if you didn't understand, reread and you will get it)

Now let's see the attack sequences

	left - right	up - down	forward	backward	lunge
a	○	○	●	○	○
b	○	○	●	○	○
c	● right parry (2)	● down	○	○	○
d	○	○	○	○	●
e	○	○	○	●	○
Attack 1					
a	○	○	●	○	○
b	● left parry (4)	● up	○	○	○
c	○	○	○	○	●
d	○	○	●	○	○
e	○	○	○	●	○
Attack 2					
a	○	○	○	○	○
b	○	○	●	○	○
c	● right (2)	● down	○	○	○
d	● left (4)	● up	○	○	○
e	○	○	○	○	●
Attack 3					
a	○	○	○	○	○
b	● left (3)	● down	○	○	○
c	● right (6)	● up	○	○	○
d	○	○	○	○	●
e	○	○	●	○	○
Attack 4					
a	○	○	○	○	○
b	○	○	○	○	○
c	○	○	○	○	○
d	○	○	○	○	○
e	○	○	○	○	○
Attack 5					
a	○	○	○	○	○
b	○	○	○	○	○
c	○	○	○	○	○
d	○	○	○	○	○
e	○	○	○	○	○



To summarize:

The system is capable of making pry 2, 4, 5, 6, lunge and back, move forward and backwards and, has "random enough" attack sequences. Using only mechanical components and number of sources (1 source = 1 electric motor) are reduced. Solution is simple and elegant.