

NOW WE COME TO ONE OF THE MOST FASCINATING DEVICES IN ANIMATION —

BREAKING OF JOINTS  
TO GIVE FLEXIBILITY

AND EVEN MORE INTERESTING:

SUCCESSIVE BREAKING OF  
JOINTS TO GIVE FLEXIBILITY

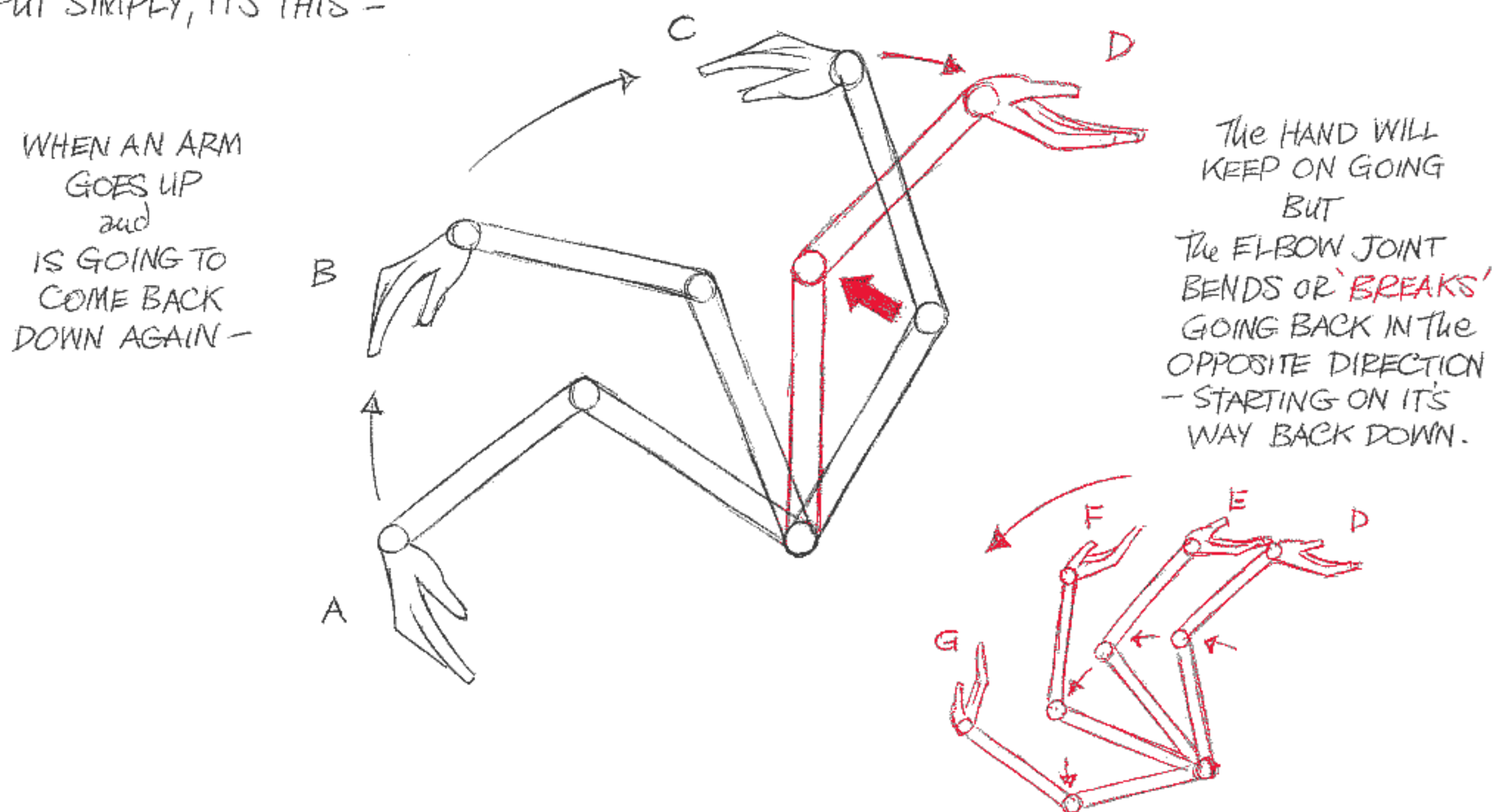
i.e. WE KEEP **ON** DOING IT TO LOOSEN THINGS UP.

IT'S QUITE A MOUTHFUL. THE PIONEER DISNEY ANIMATORS DISCOVERED THIS DEVICE and ALL THE GOOD GUYS WERE DOING IT, BUT ART BARBITT WAS THE ONE WHO GAVE IT A NAME.

WHEN I NOTICED MILT KAHL DOING IT, I REMARKED ON IT, and MILT SAID, "OH, WELL, YOU'VE **GOT** TO DO **THAT**." I THINK IF I'D SAID, "OH, I NOTICE THAT YOU'RE BREAKING THE JOINTS HERE SUCCESSIVELY IN ORDER TO GIVE FLEXIBILITY," HE'D HAVE THROWN ME OUT OF THE ROOM.

IT'S NOT WHAT IT'S CALLED - BUT WHAT **IS** IT?

PUT SIMPLY, IT'S THIS —



'**BREAKING**' MEANS **BENDING** THE JOINT WHETHER OR NOT IT WOULD ACTUALLY BEND IN REALITY.

AND THEN WE'RE GOING TO KEEP **ON** DOING IT CONTINUOUSLY - 'SUCCESSIVELY' - TO MAKE THINGS LIMBER.

GRIM NATWICK, THE FIRST ANIMATOR TO REALLY DRAW WOMEN, ALWAYS SAID,  
'CURVES ARE BEAUTIFUL TO WATCH.'

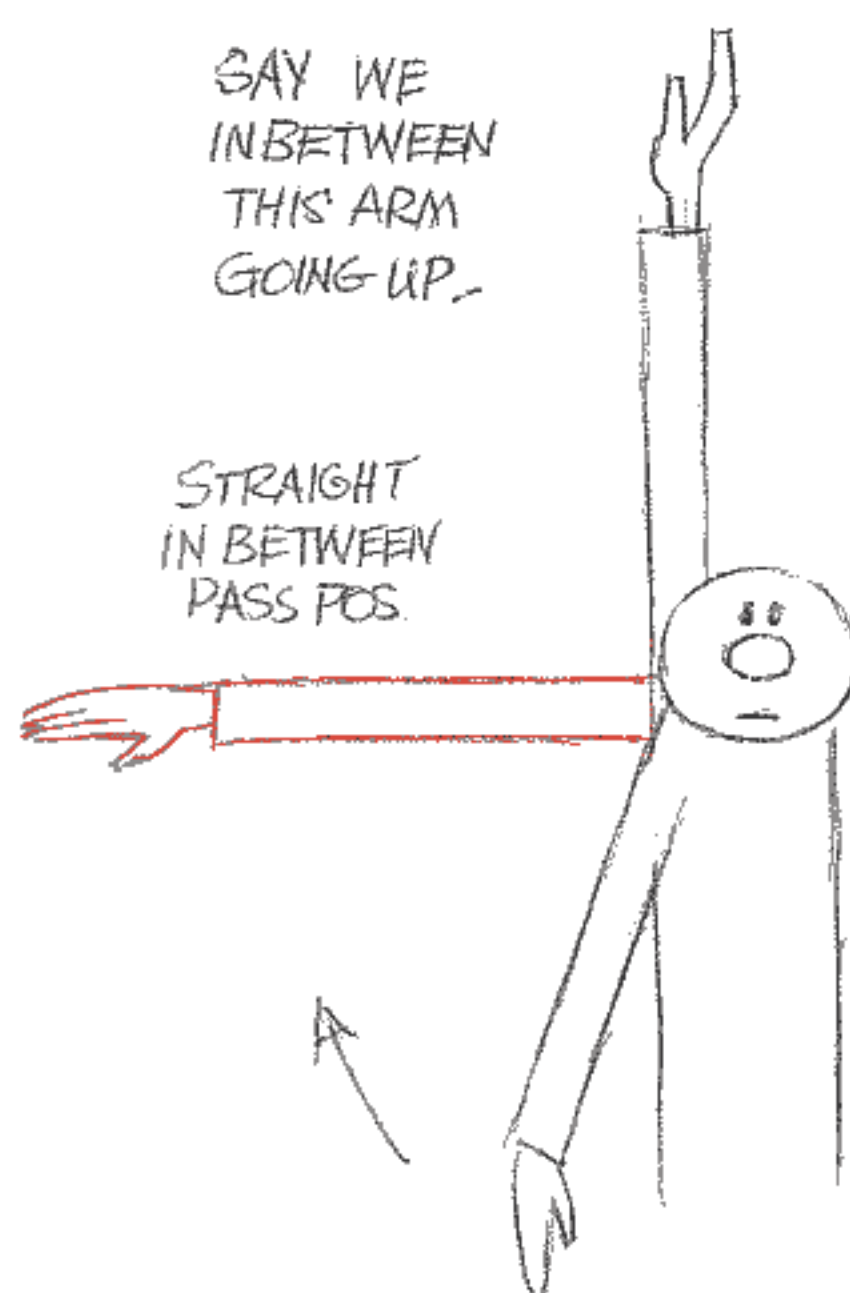
IN THE 1920'S GRIM'S FRIEND, ANIMATOR BILL NOLAN DEVELOPED 'RUBBER HOSE' ANIMATION. IT WAS NOVEL AND FUNNY SINCE NOBODY HAD ANY BONES AND EVERYTHING FLOWED WITH ENDLESS CURVING ACTIONS - LOTS OF VARIATIONS ON FIGURE 8'S, ROUND FIGURES MAKING ROUNDED ACTIONS.



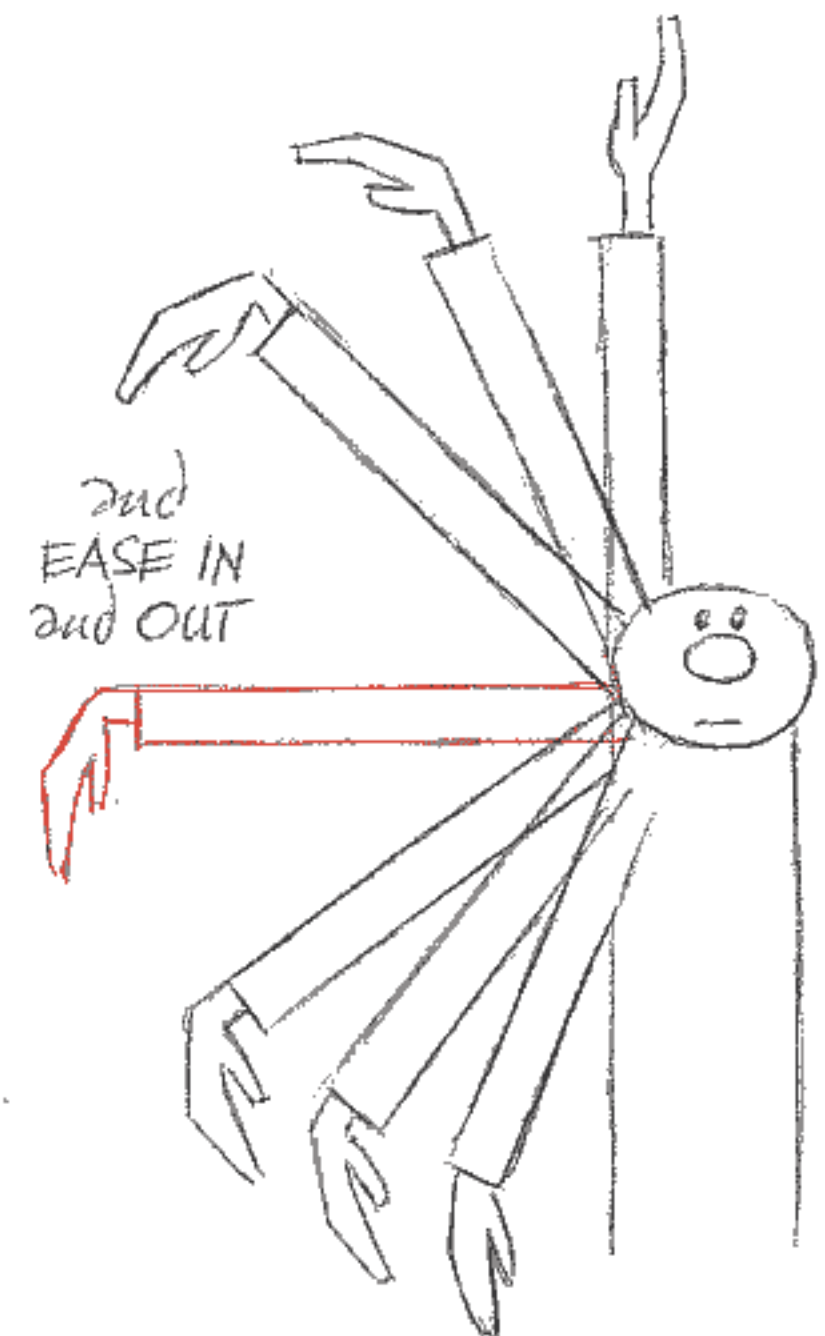
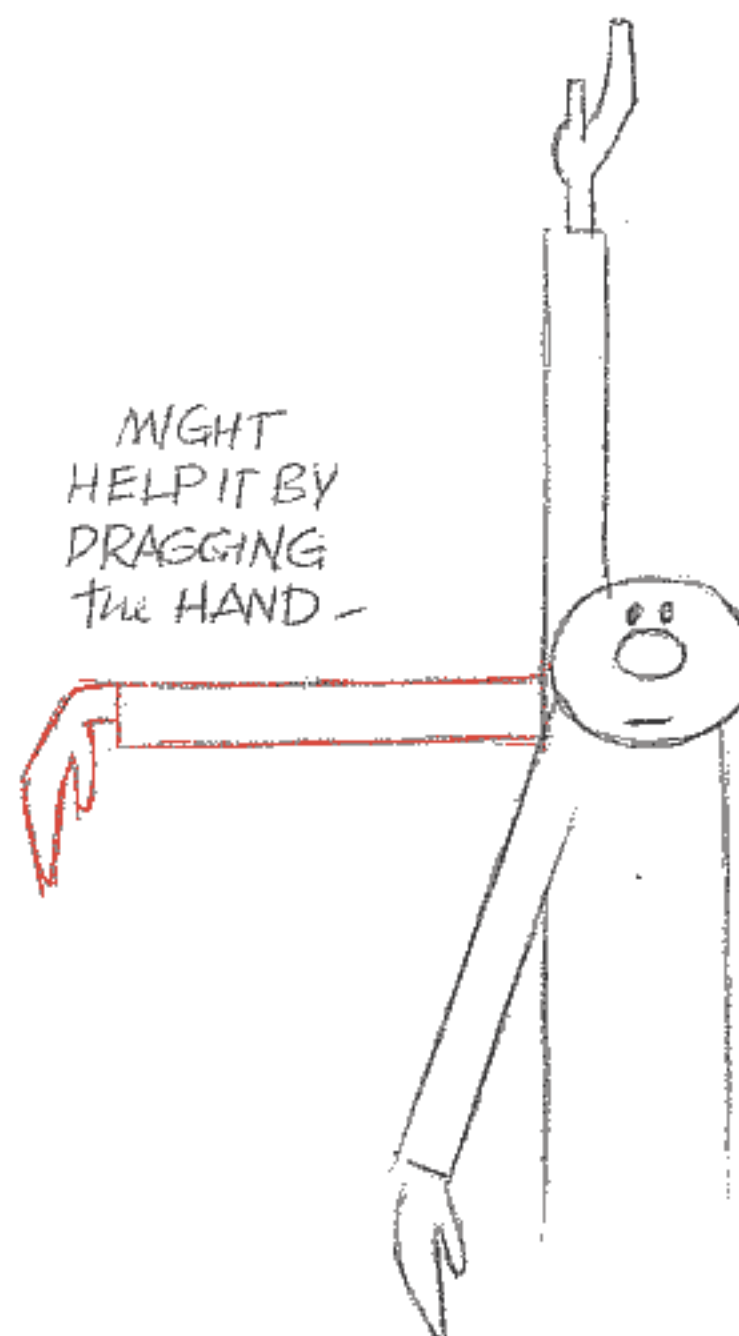
BUT NOW WE CAN GET CURVES WITH STRAIGHT LINES!

SUCCESSIVE BREAKING JOINTS ENABLE US TO GET THE **EFFECT** OF CURVED ACTION BY USING STRAIGHT LINES.

WE'RE FREED FOREVER FROM THE TYRANNY OF **HAVING** TO ANIMATE RUBBERY FIGURES. I ALWAYS FIGURED THAT 'DRAWINGS THAT WALK AND TALK' SHOULD BE **ANY** TYPE OF FIGURE IN ANY STYLE, MADE OF FLESH **AND** BONES. THIS OPENS UP A PANDORA'S BOX OF STUFF. WHAT A TOOL! WE CAN HAVE BONES AND 'STRAIGHTS' IN OUR FIGURES AND STILL HAVE FLUID, FLOWING MOVEMENT.



IT'S GOING TO BE STIFF AS A BOARD.



IT'S STILL AWFULLY RIGID.

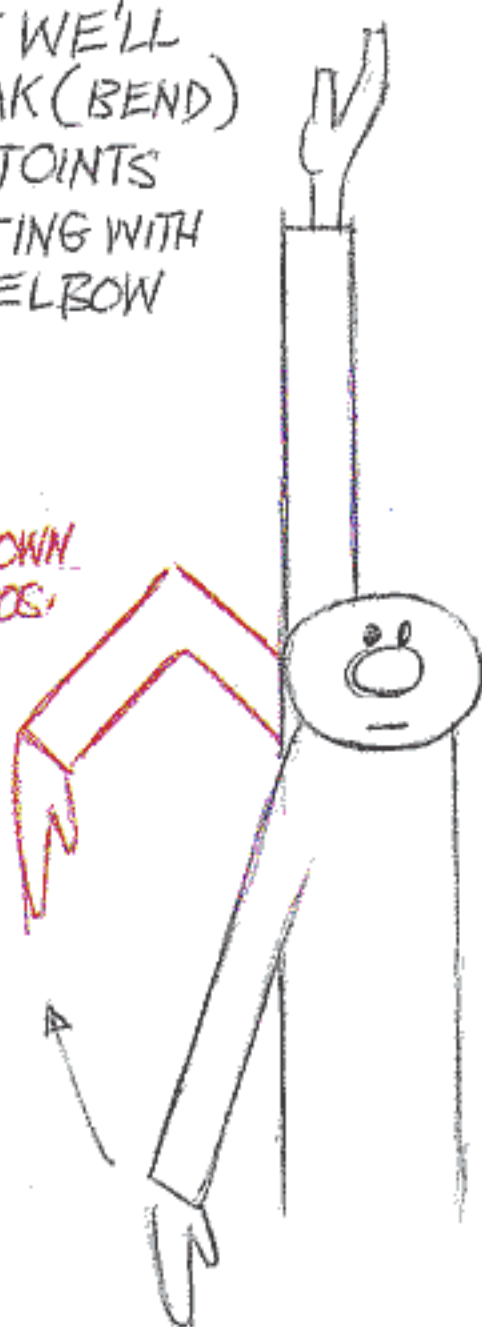


WE WON'T DUCK THE PROBLEM WITH A RUBBERISED ARM -



BUT WE'LL  
BREAK (BEND)  
THE JOINTS  
STARTING WITH  
THE ELBOW

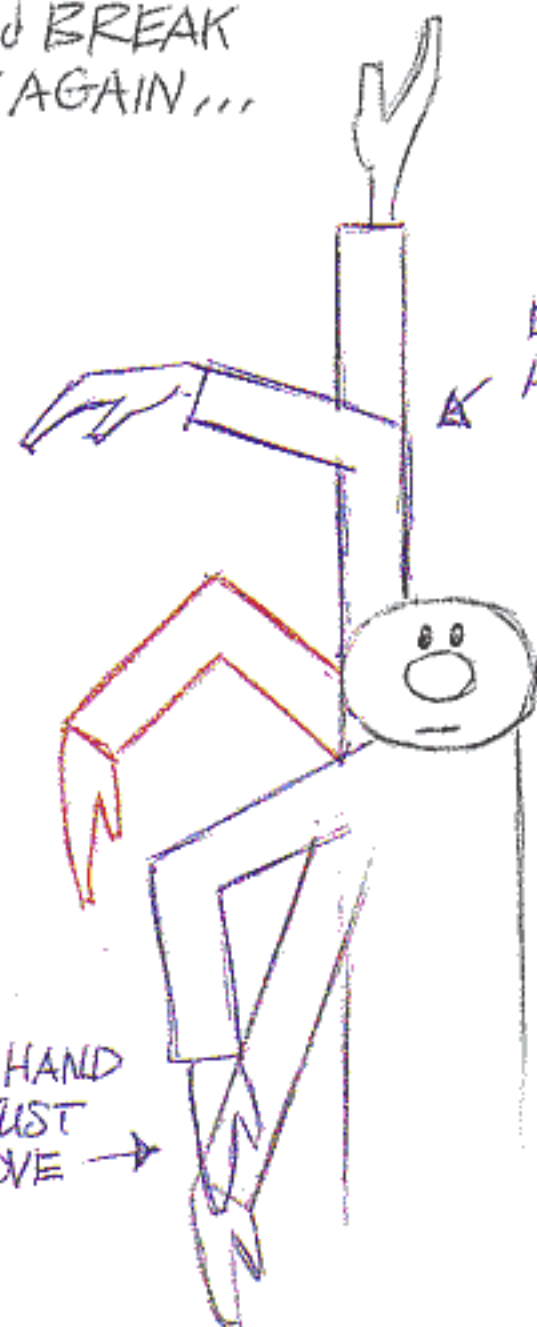
BREAKDOWN  
OR PASS POS.



and BREAK  
IT AGAIN...

THE  
ELBOW  
ARRIVES  
FIRST

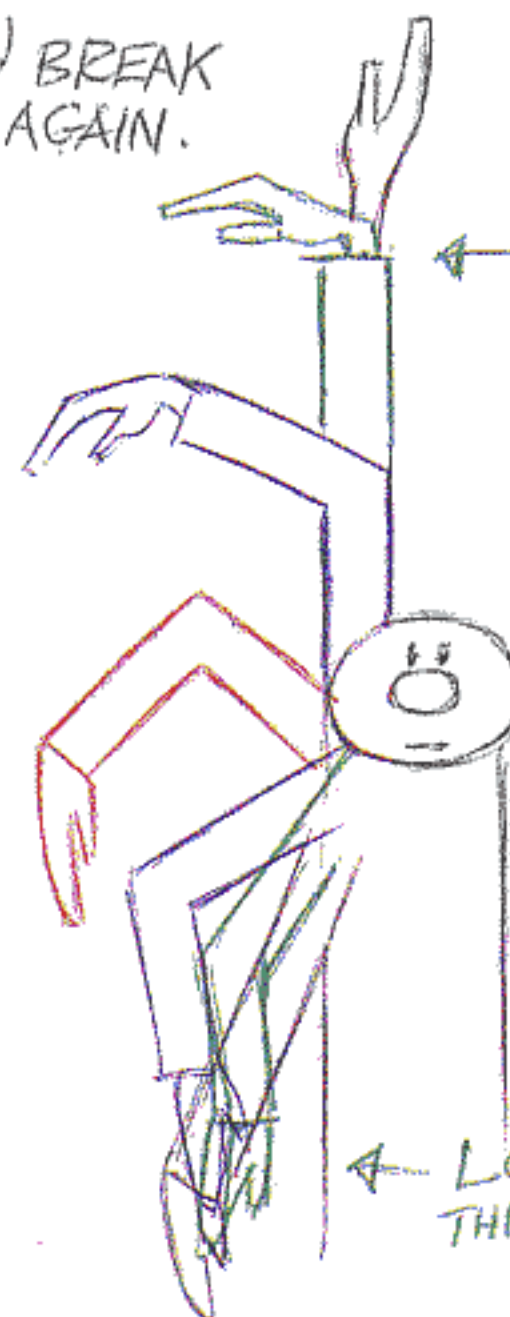
THIS HAND  
IS JUST  
ABOVE



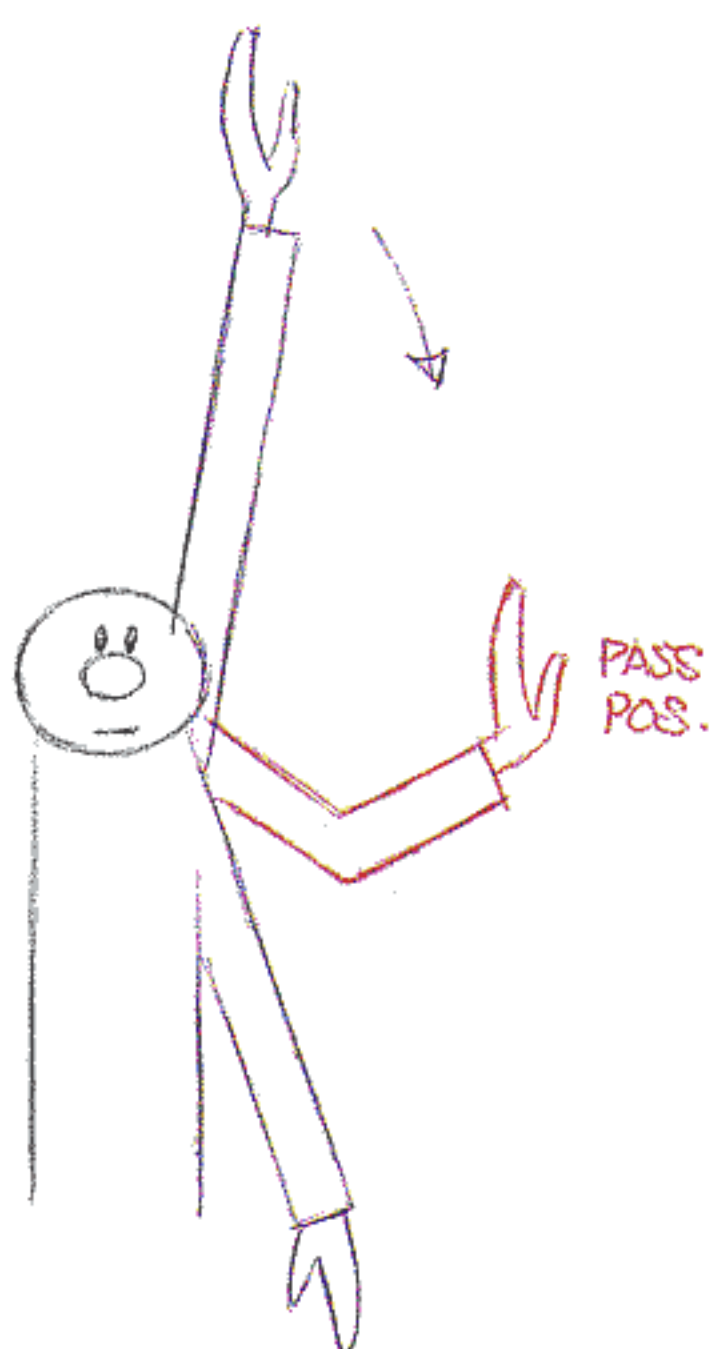
... and BREAK  
IT AGAIN.

THEN THE  
WRIST  
ARRIVES  
BEFORE  
THE HAND

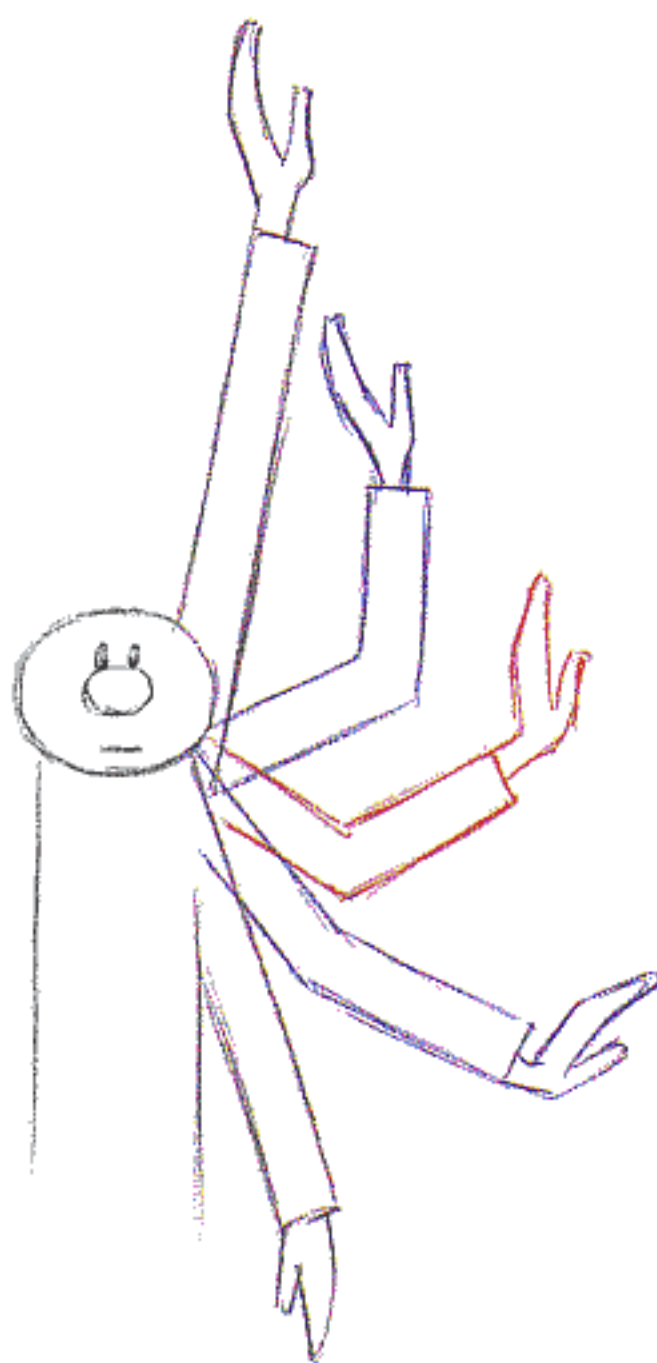
LOOK WHERE  
THIS HAND IS.



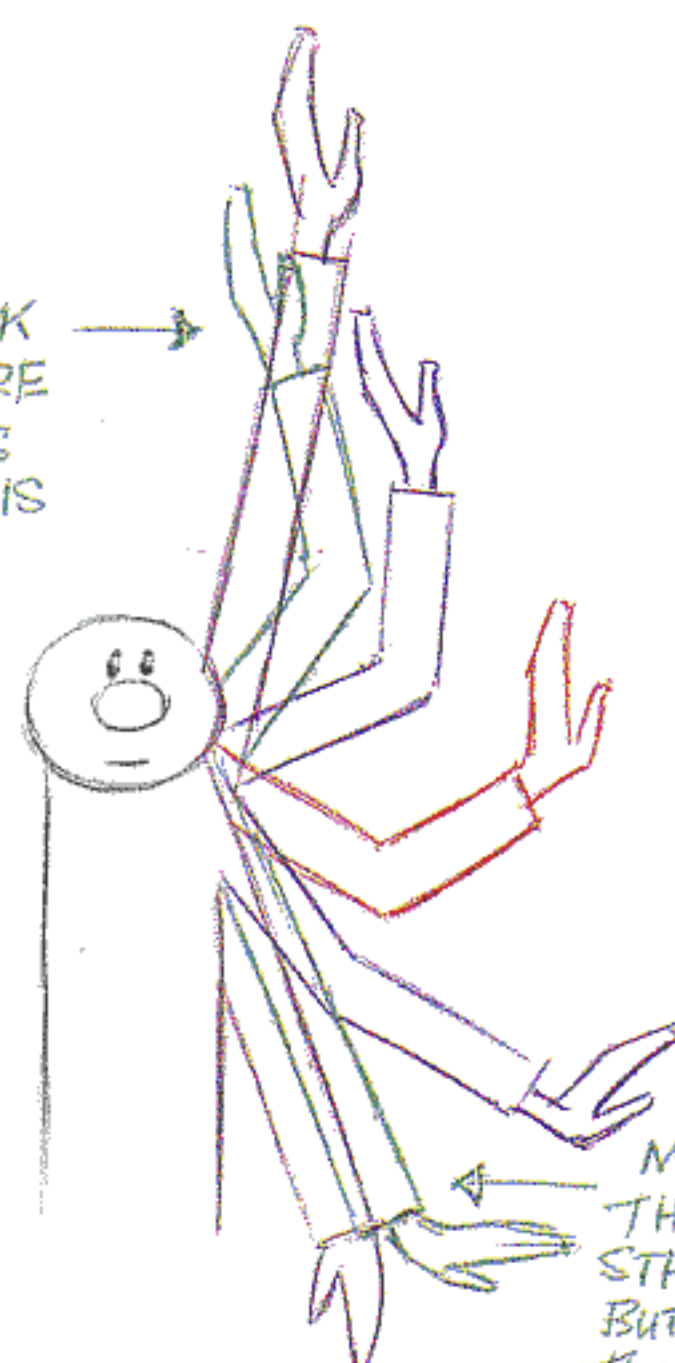
NOW WE GO DOWN THE OTHER SIDE - SUCCESSIVELY BREAKING THE JOINTS:



PASS  
POS.



LOOK  
WHERE  
THIS  
ONE IS



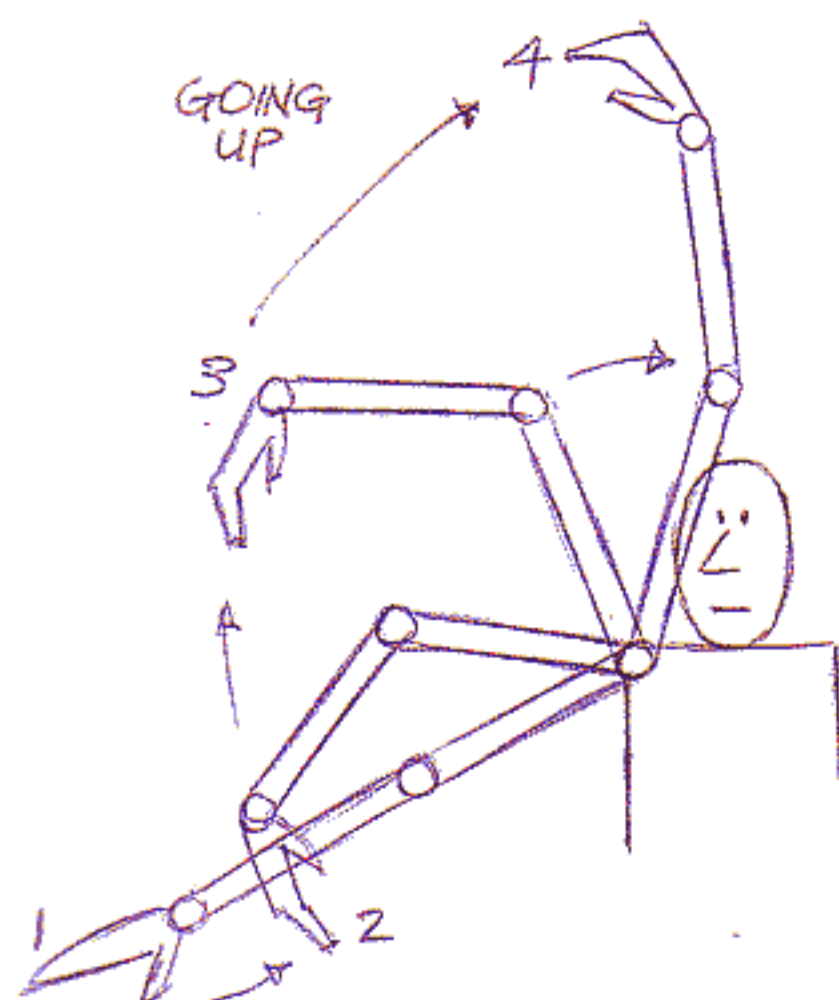
MAKE  
THIS ONE  
STRAIGHT  
BUT DELAY  
THE HAND

IN THIS EXAMPLE ALL THE BENDS OR 'BREAKS' ARE PHYSICALLY POSSIBLE.  
WE HAVEN'T HAD TO ACTUALLY BEND OR BREAK ANYTHING THE WRONG WAY YET.

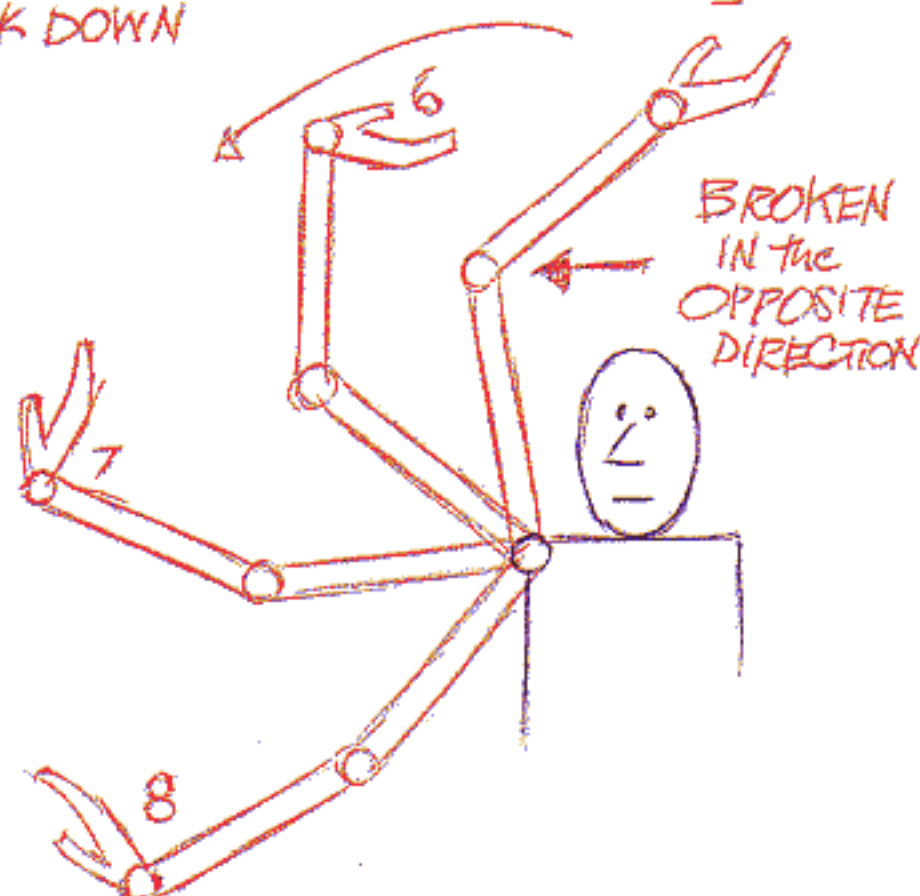
(BUT WE CAN)



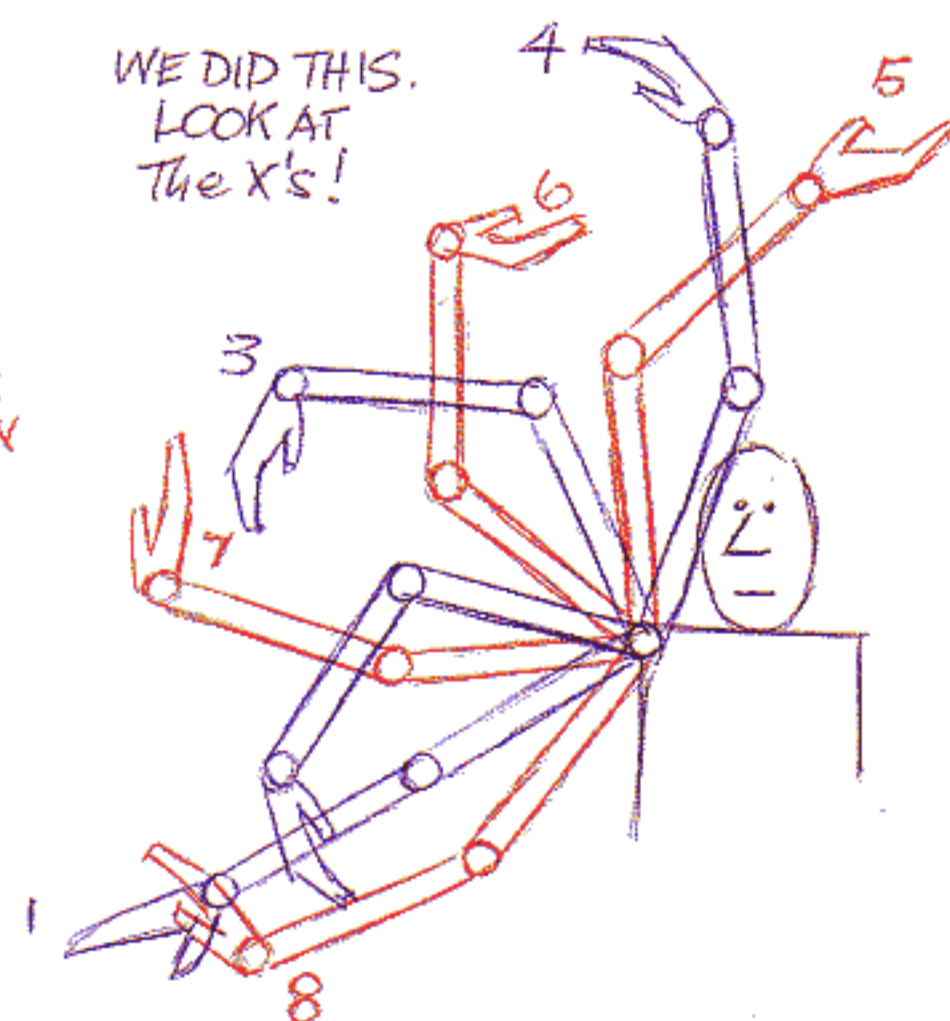
LET'S DO IT AGAIN: The ELBOW LEADS and The JOINTS BREAK IN SUCCESSION -



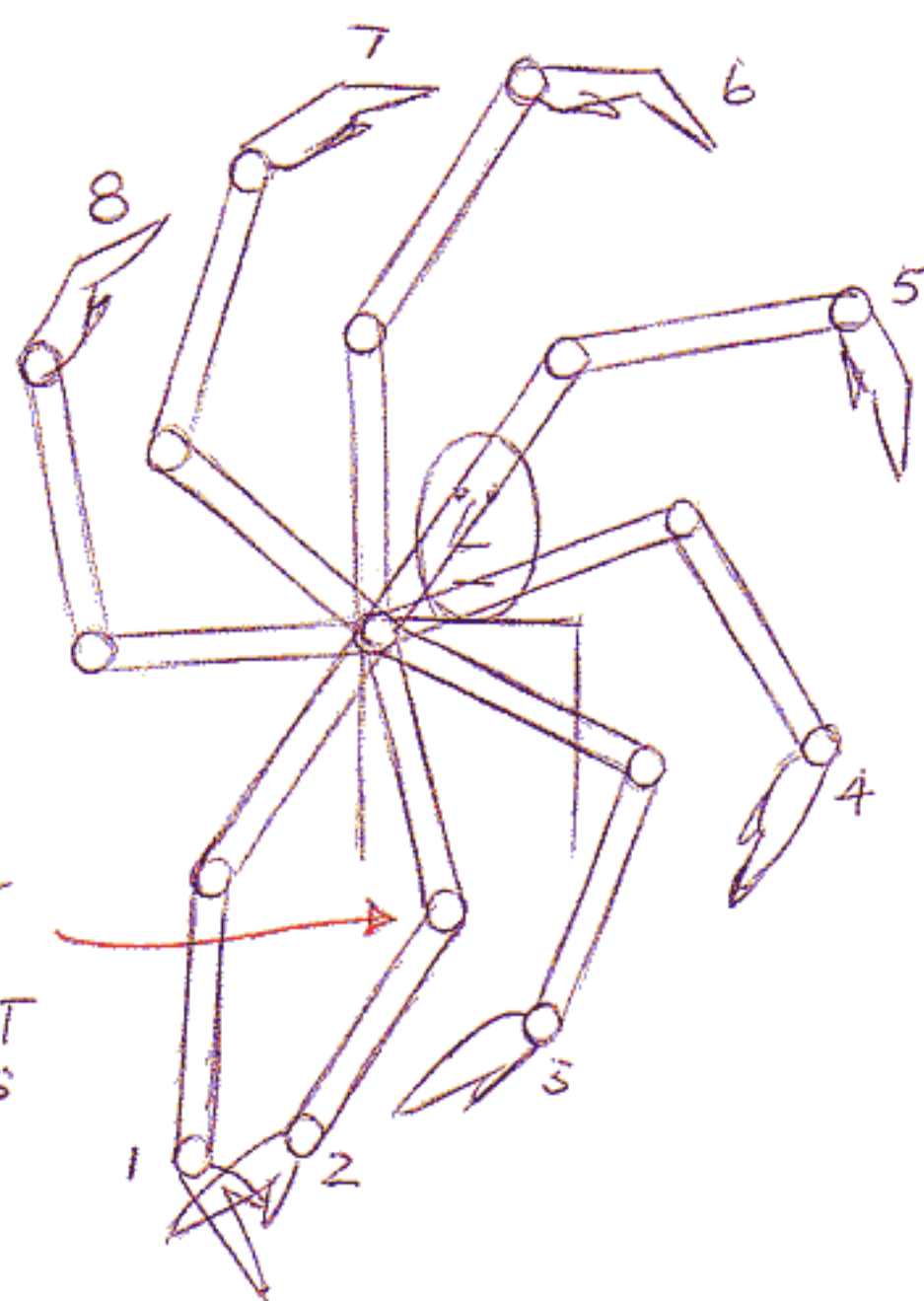
and GOING BACK DOWN



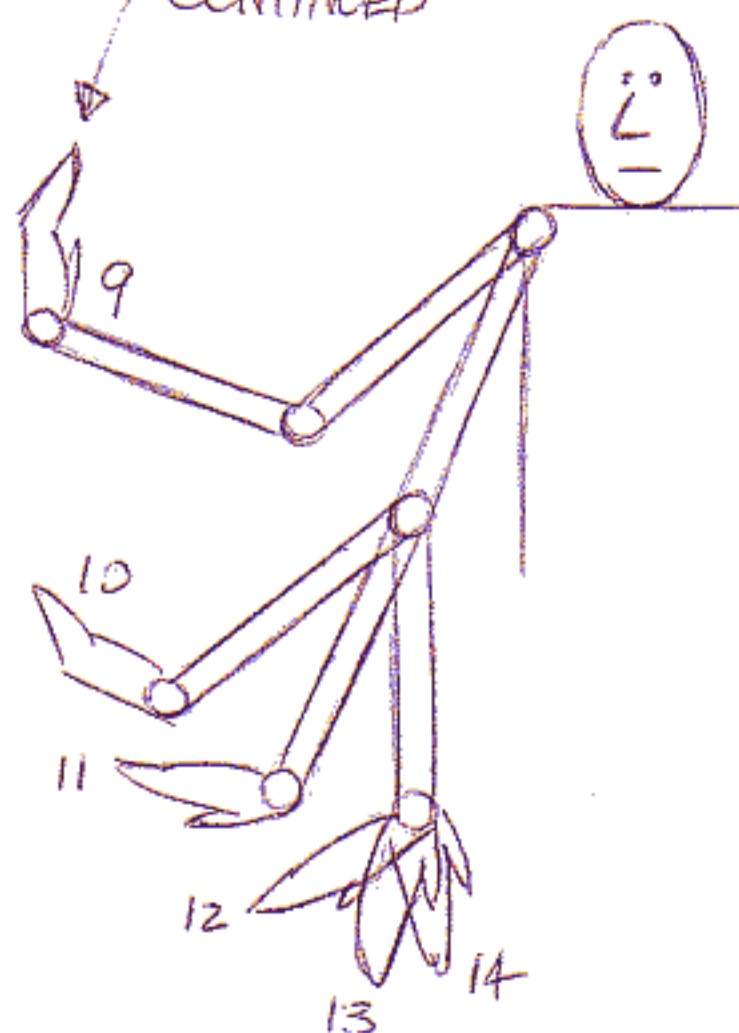
WE DID THIS. LOOK AT the X's!



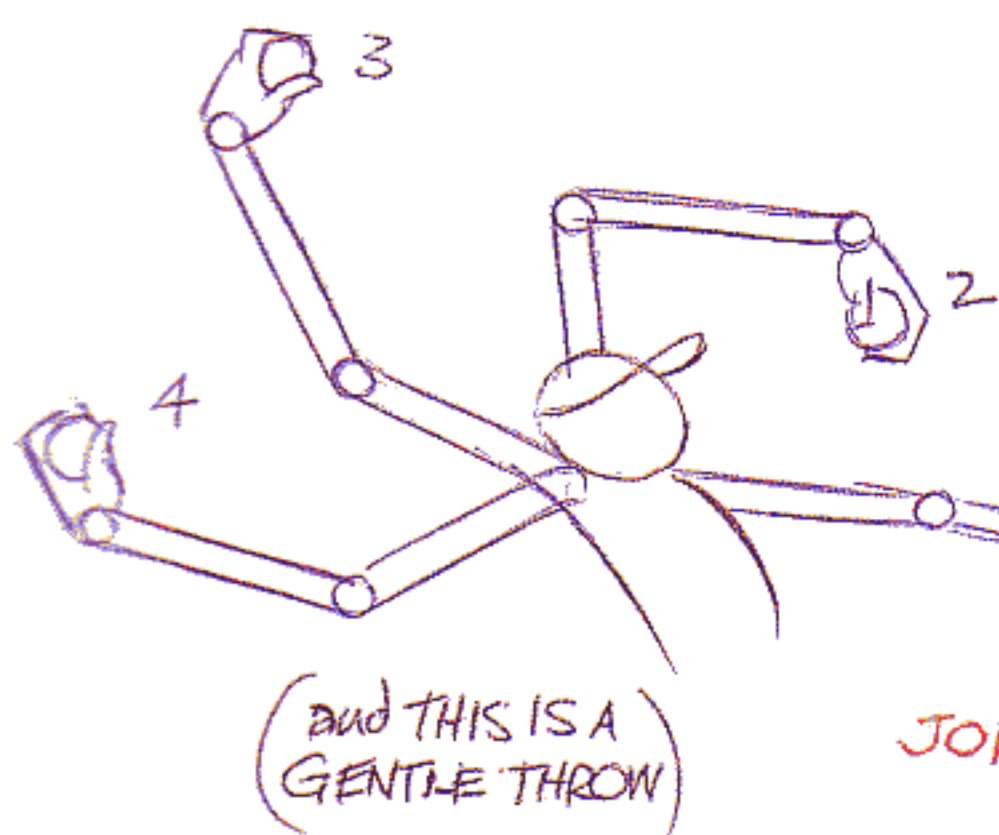
LET'S GO AROUND IN A CIRCLE. The ELBOW LEADS -



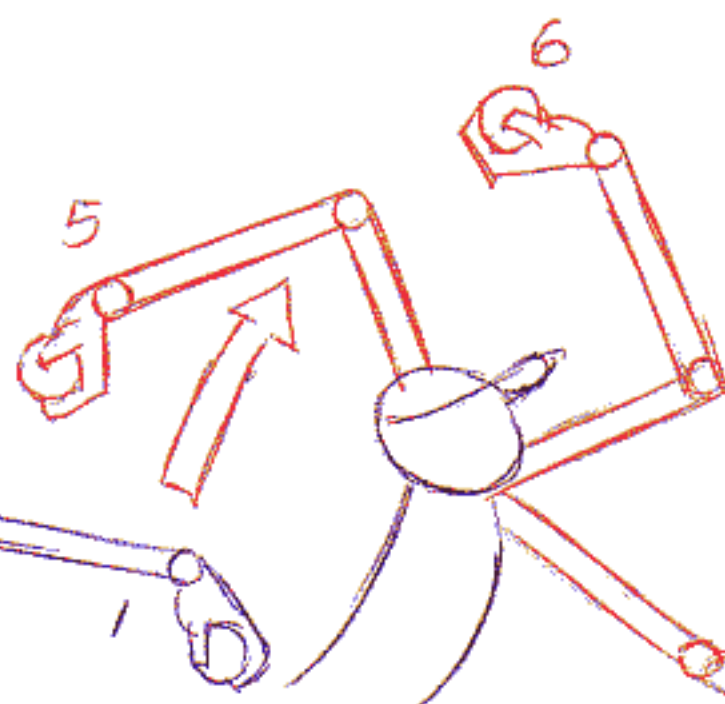
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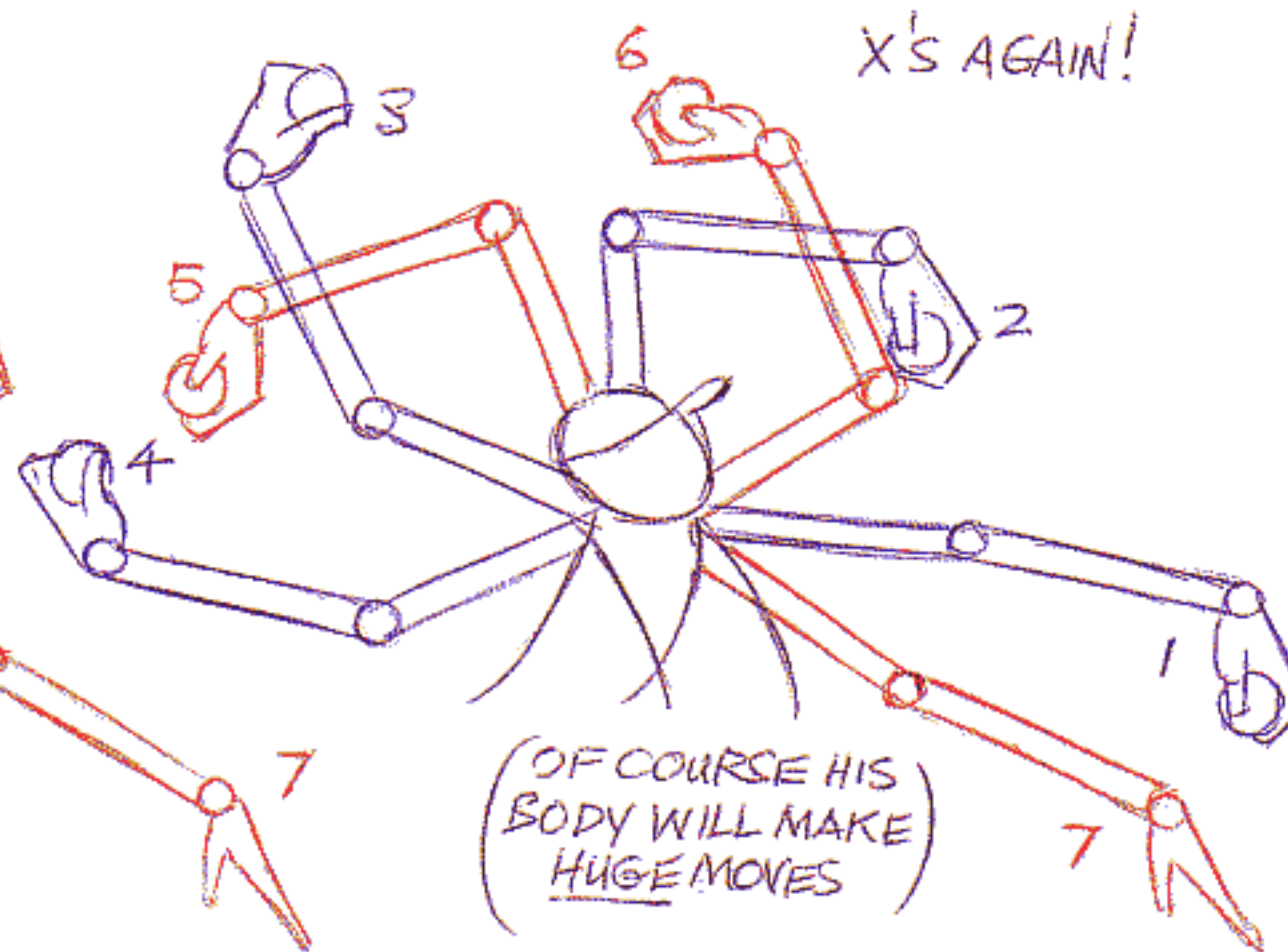
IT'S WHAT A BASEBALL PITCHER DOES -



JOINTS BREAK IN OPPOSITE DIRECTION



X'S AGAIN!





A THING TO REMEMBER IN BREAKING THE JOINTS SUCCESSIVELY IS -

WHERE DOES THE ACTION **START**?

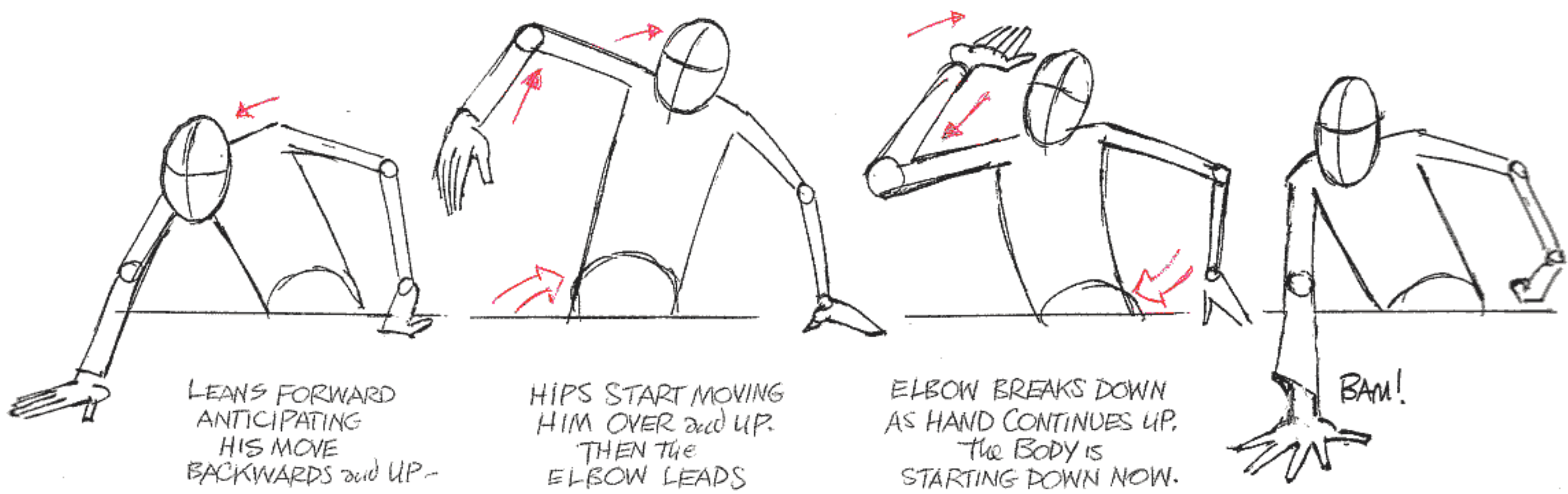
WHAT **STARTS MOVING FIRST**?

IS IT THE ELBOW? THE HIPS? THE SHOULDER? HEAD?

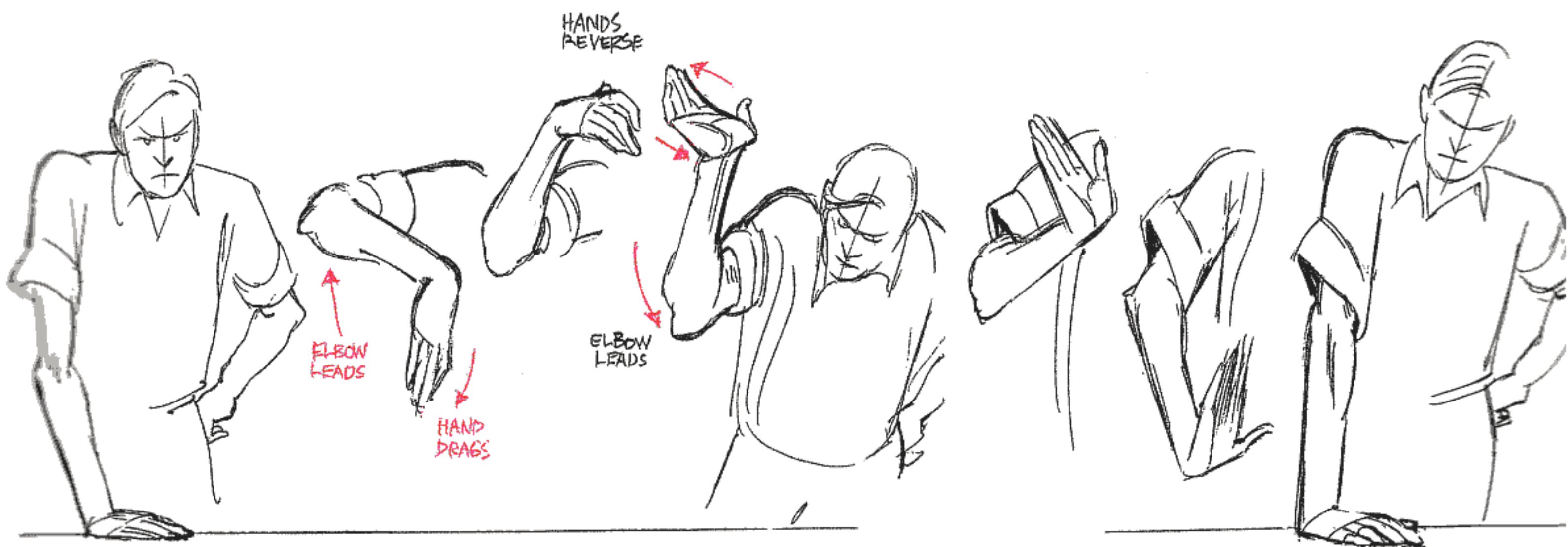
IN MOST **BIG** ACTIONS OF THE BODY THE **SOURCE**, THE **START** OF THE ACTION IS IN THE **HIPS**.

DANCERS SAY "GO FROM YOUR HIPS, LOVE,  
FROM THE HIPS, DEARIE."

TAKE A MAN SLAPPING A TABLE: THE ACTION STARTS FROM HIS HIPS -



WE HAVE LOTS OF LEEWAY TO ACCENTUATE and EXAGGERATE BREAKING JOINTS  
BECAUSE IT HAPPENS ALL THE TIME IN REALITY.

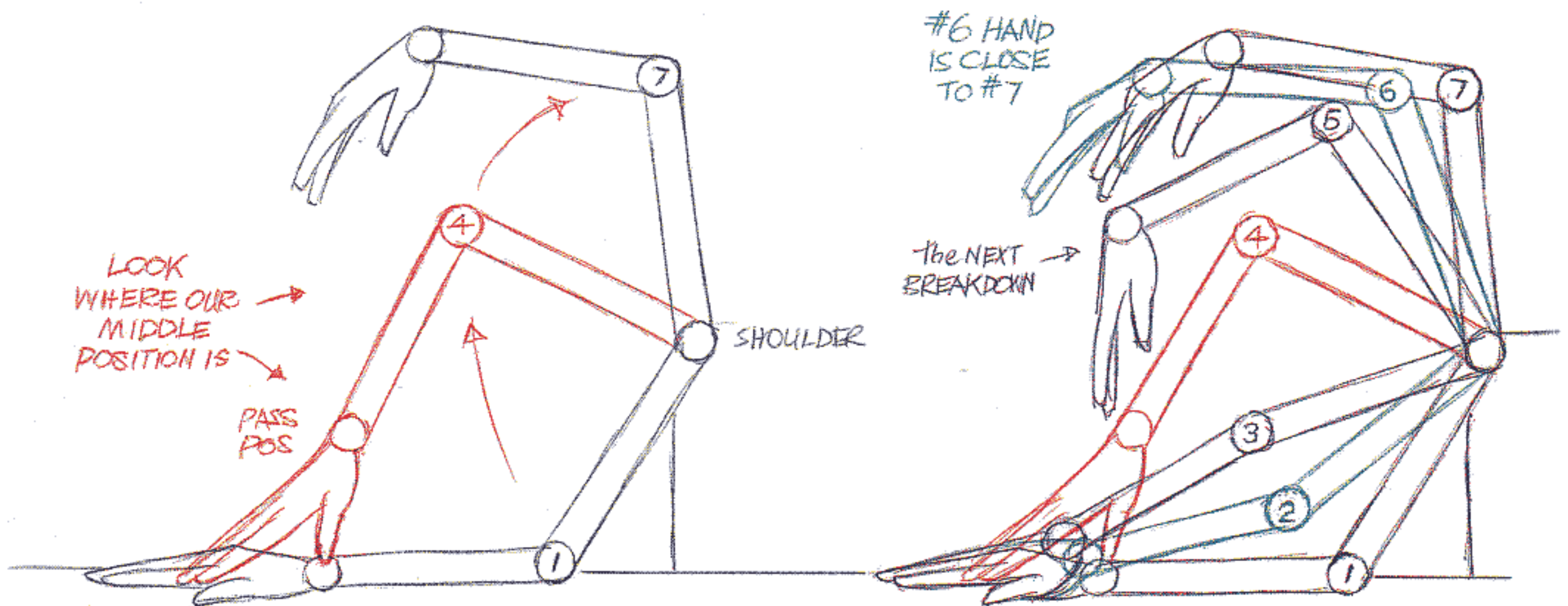




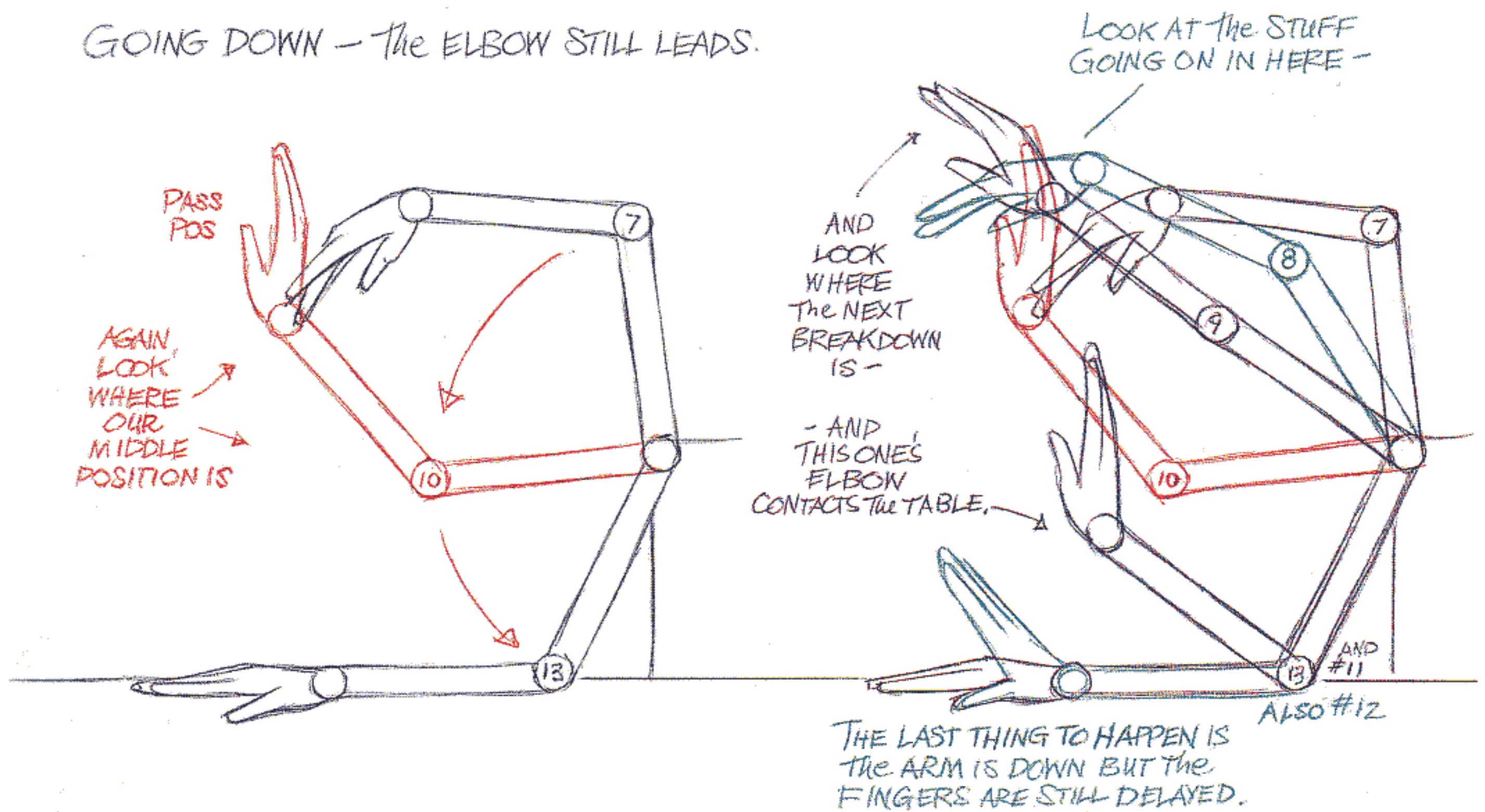
LET'S KEEP ON HITTING THE TABLE -

IT'S AN AWFULLY GOOD EXAMPLE OF HOW WE CAN ACHIEVE THE SAME FLEXIBILITY AS 'RUBBER HOSE' ANIMATION BY BREAKING THE JOINTS WHEREVER WE CAN -

GOING UP - THE ELBOW LEADS and the HAND DRAGS.



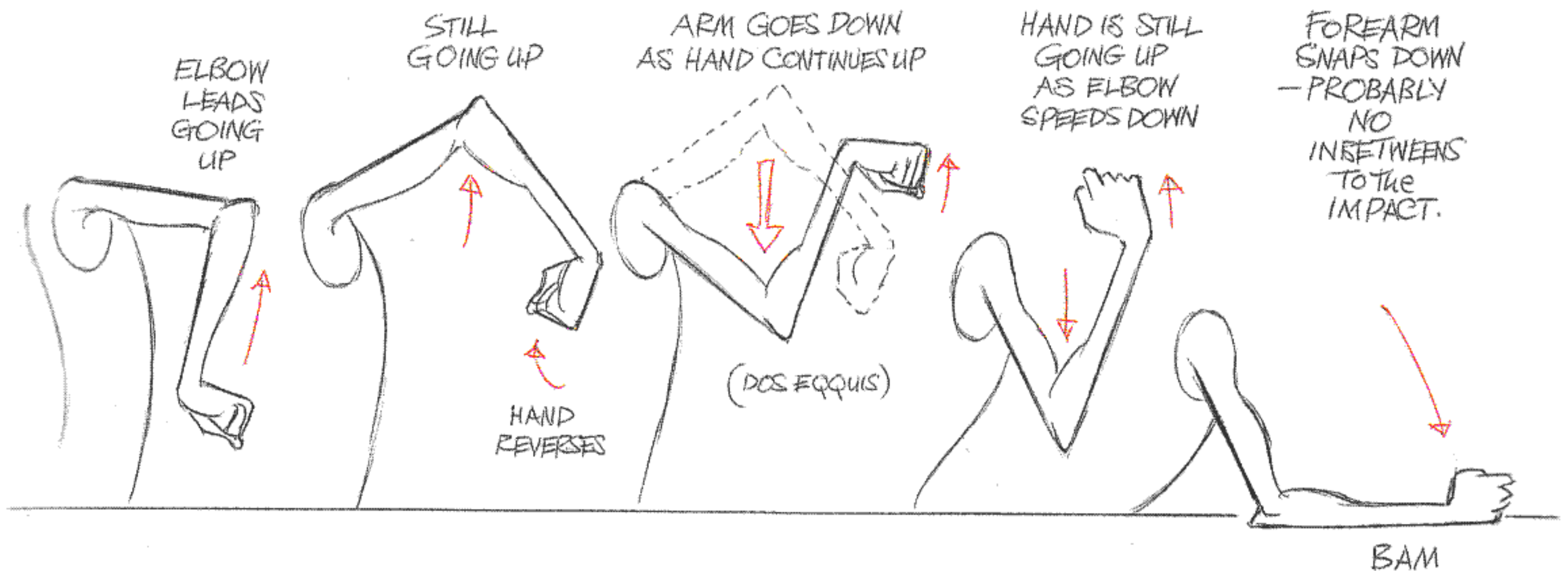
GOING DOWN - THE ELBOW STILL LEADS.





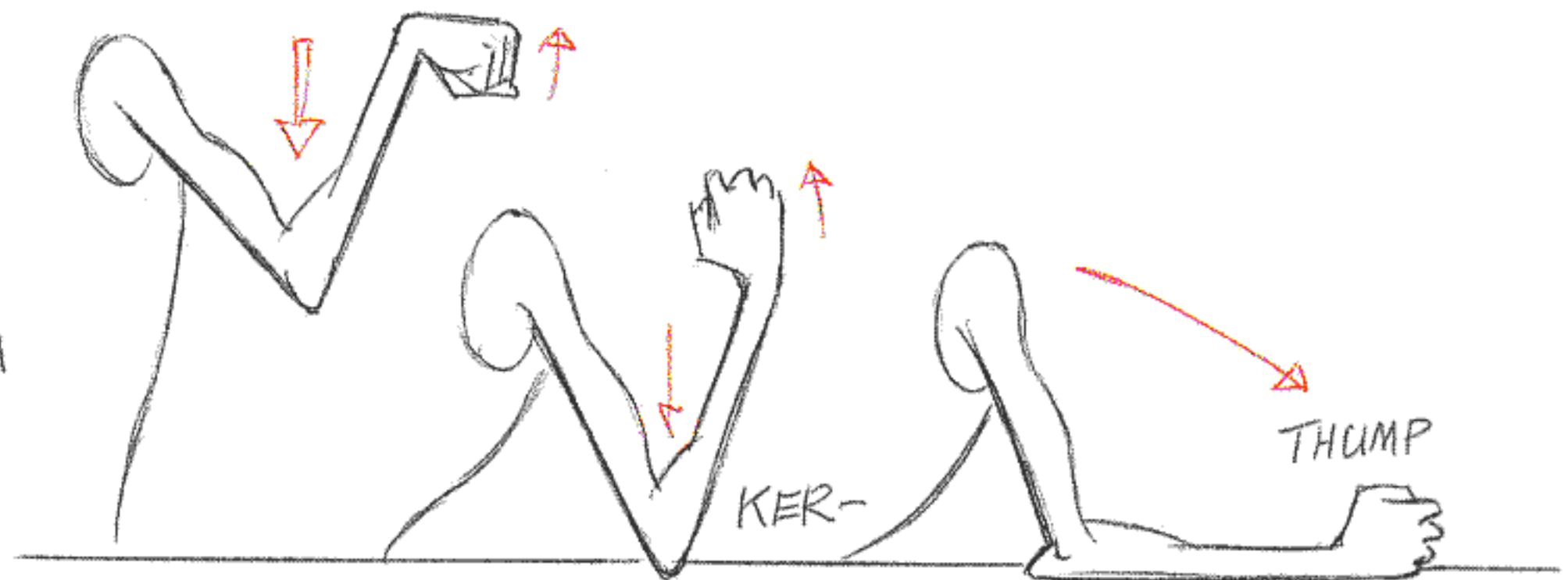
ONE MORE TIME - SHOWING THE IDEA SIMPLY.

NOW HE'S GOING TO **BANG HIS FIST** ON THE TABLE -

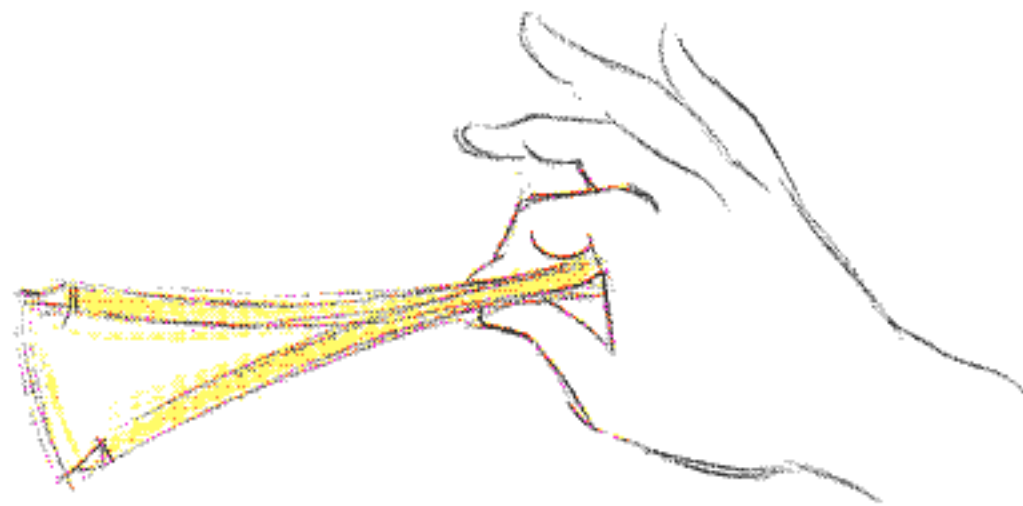


**OR**

AS ON THE PRECEDING PAGE  
THE ELBOW HITS THE TABLE  
FIRST -  
FOLLOWED BY THE FOREARM  
AND FIST  
= MORE UNFOLDING.



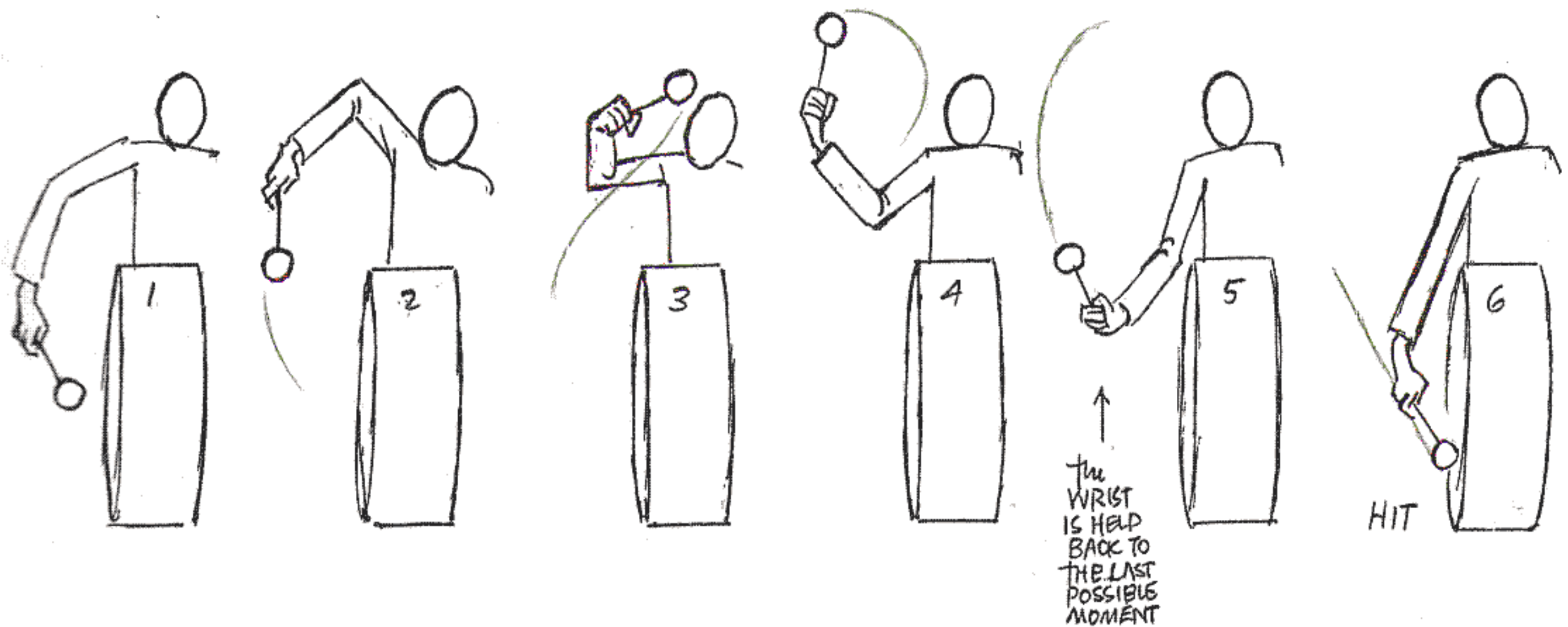
IF ALL THE JOINTS DO NOT BREAK AT THE SAME TIME  
WE'LL GET ALL THE FLEXIBILITY WE'LL EVER NEED.



IT'S LIKE WHAT WE DO WHEN WE MAKE A PENCIL APPEAR RUBBERY.  
AND IT'S JUST WHAT A BALINESE, HINDU OR ORIENTAL TEMPLE DANCER OR A VAUDEVILLE  
ECCENTRIC DANCER DOES - AND FRED ASTAIRE! THEY'VE ONLY GOT STRAIGHT BONES  
AND JOINTS TO WORK WITH - TO GIVE THE ILLUSION OF CURVACEOUS, LIMBER MOVEMENT

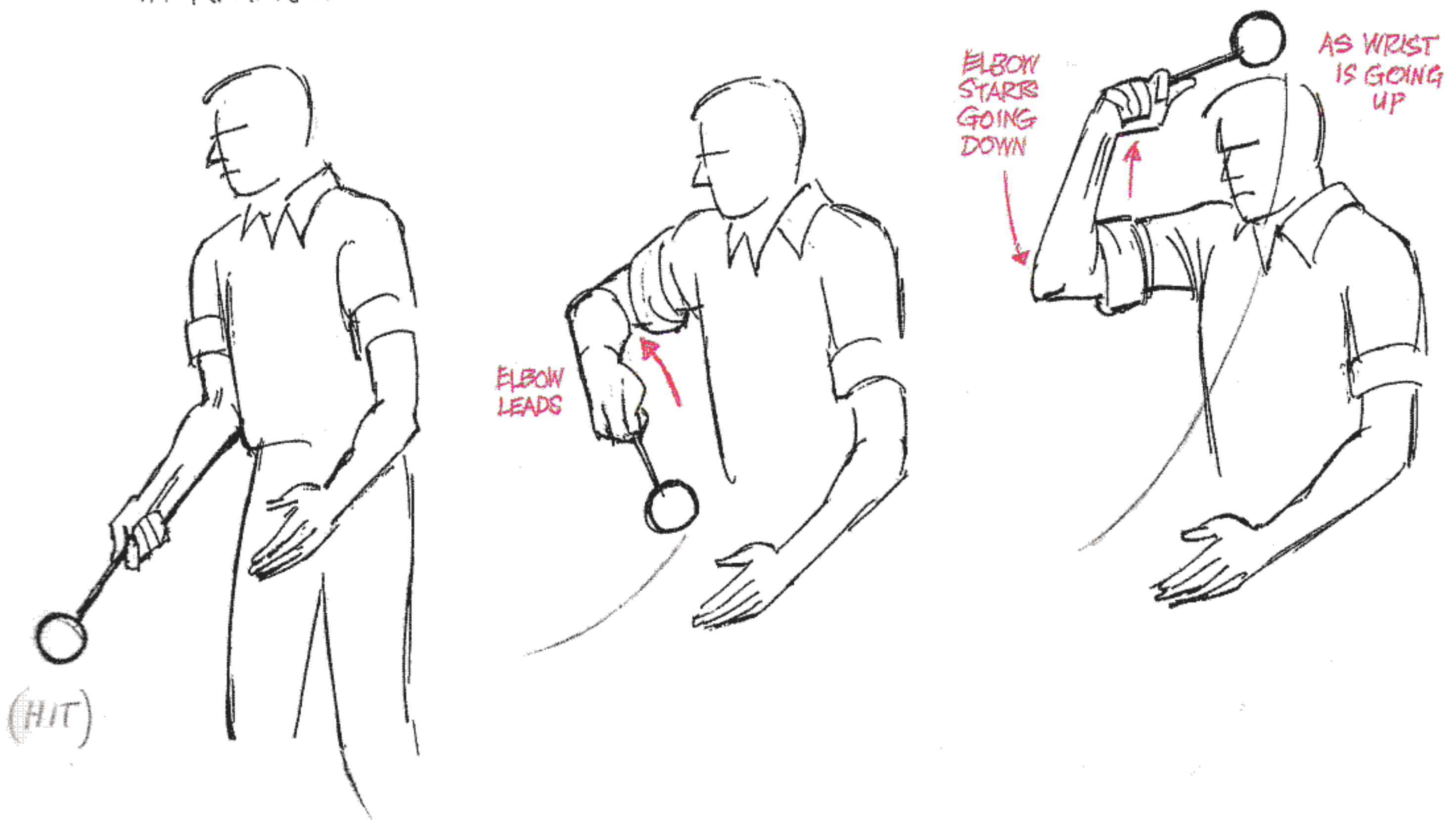


BEATING ON A BASS DRUM HAS A VERY SIMILAR ACTION TO SMACKING THE TABLE.



THIS BENT JOINT BUSINESS CAN LOOK AWFULLY COMPLICATED AT FIRST BUT YOU QUICKLY GET USED TO IT and USE IT EVERY CHANCE YOU GET. IT BECOMES SECOND NATURE and SIMPLE.

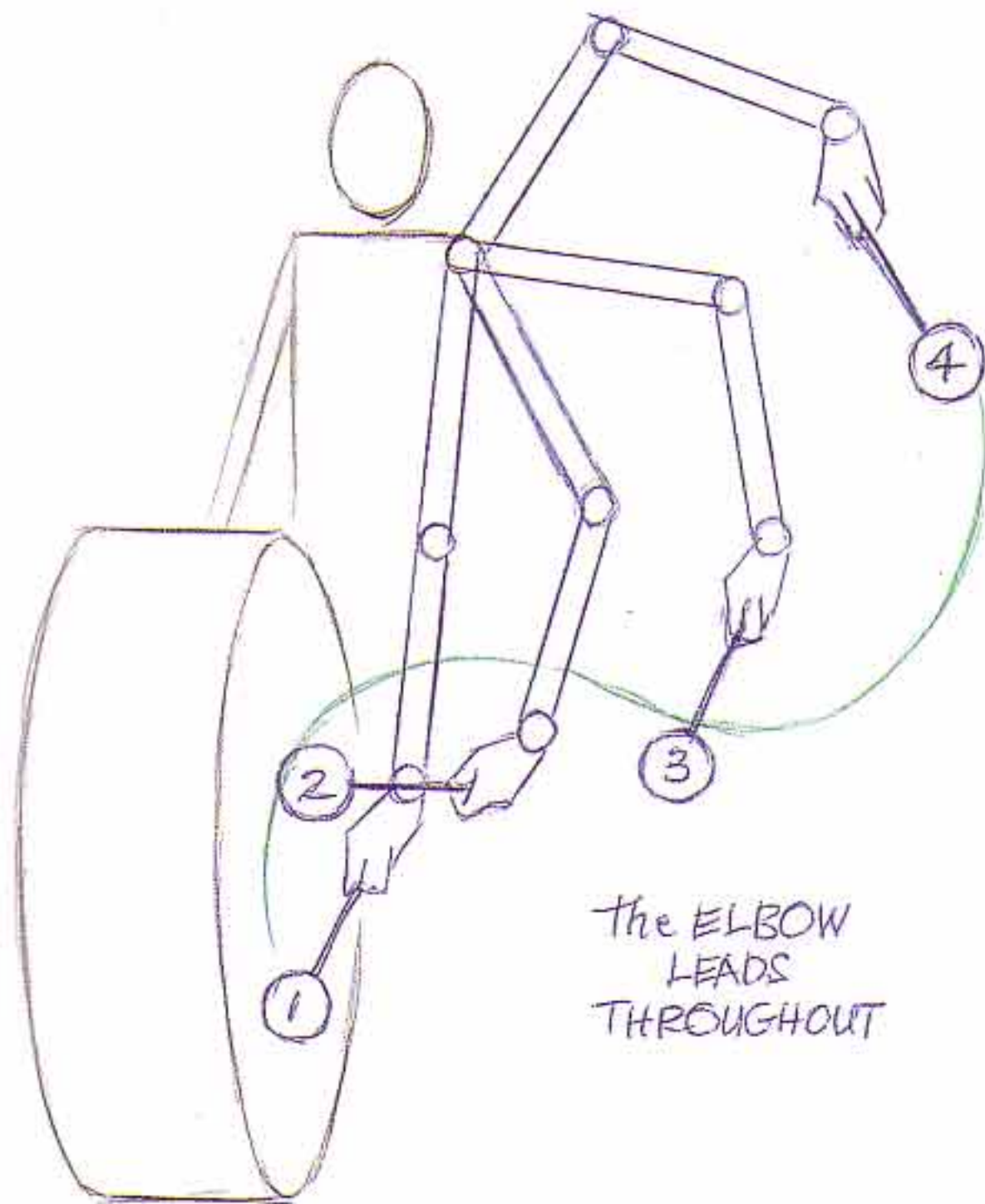
IN 'REALISM' -





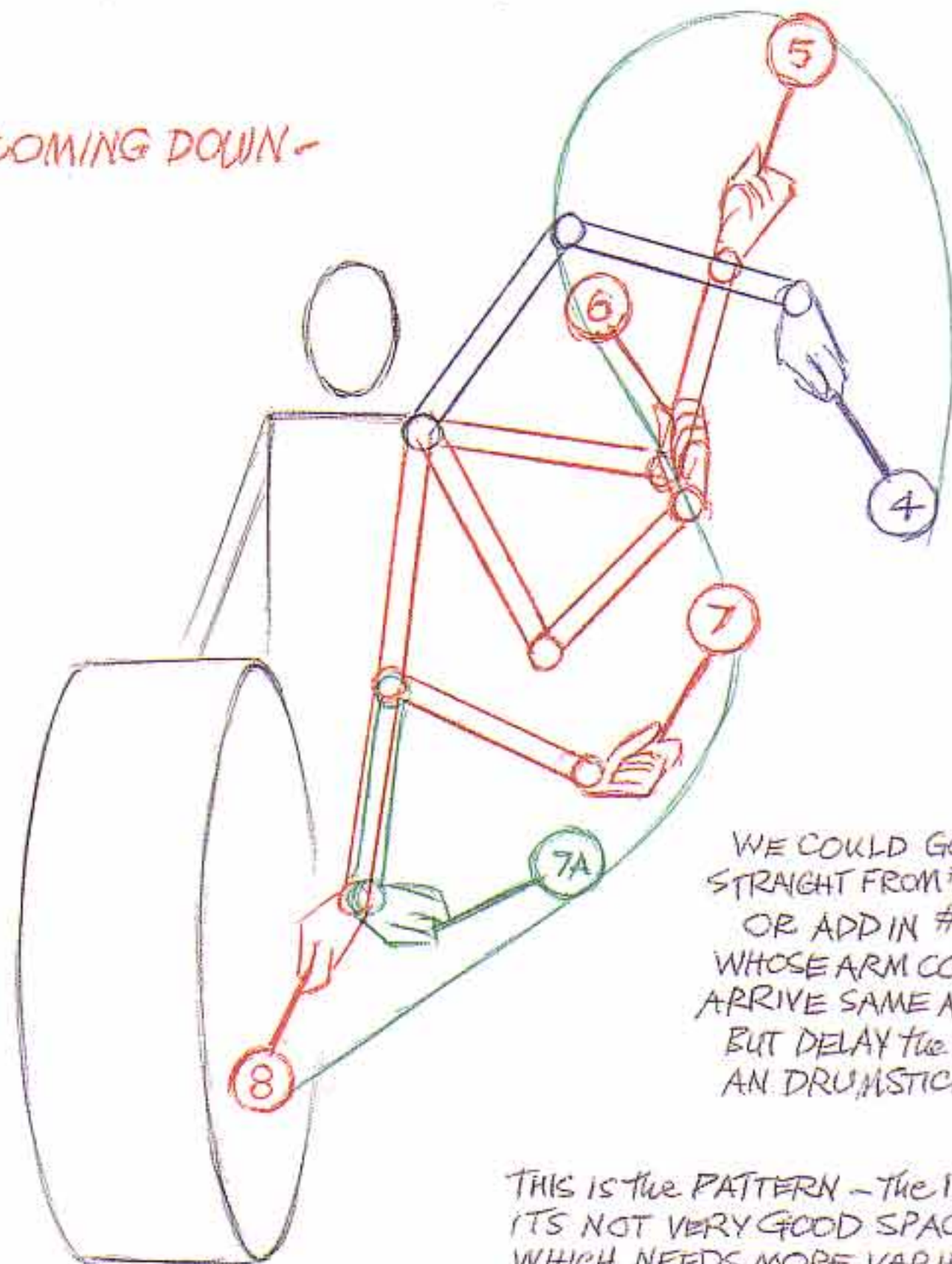
OF COURSE, DRUMMERS DO ALL KINDS OF SPINS and FLOURISHES -  
BUT THIS IS THE BASIC PATTERN -

GOING UP -



The ELBOW  
LEADS  
THROUGHOUT

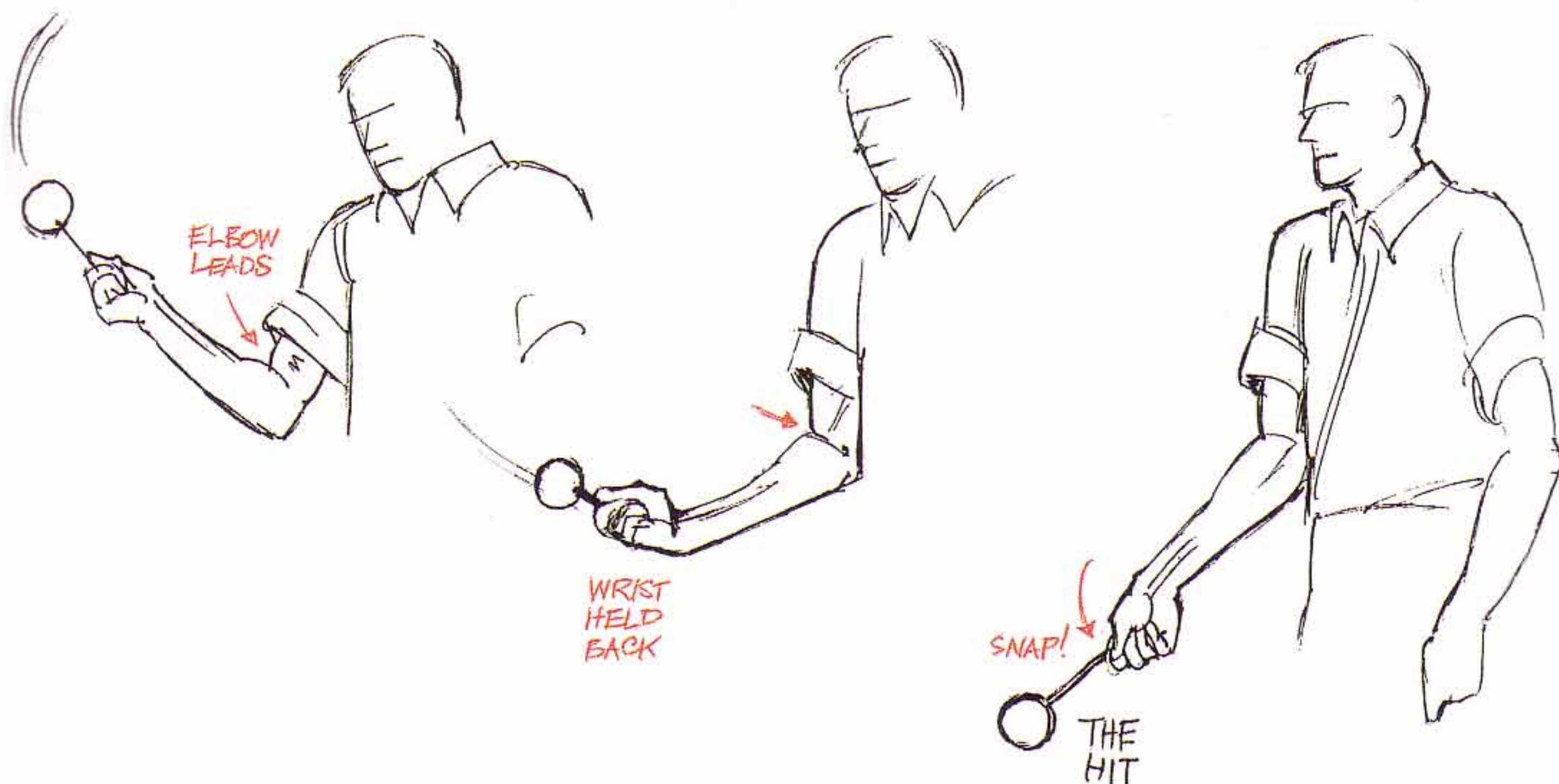
COMING DOWN -



WE COULD GO  
STRAIGHT FROM #7 to #8  
OR ADD IN #7A  
WHOSE ARM COULD  
ARRIVE SAME AS #8  
BUT DELAY THE HAND  
AND DRUMSTICK.

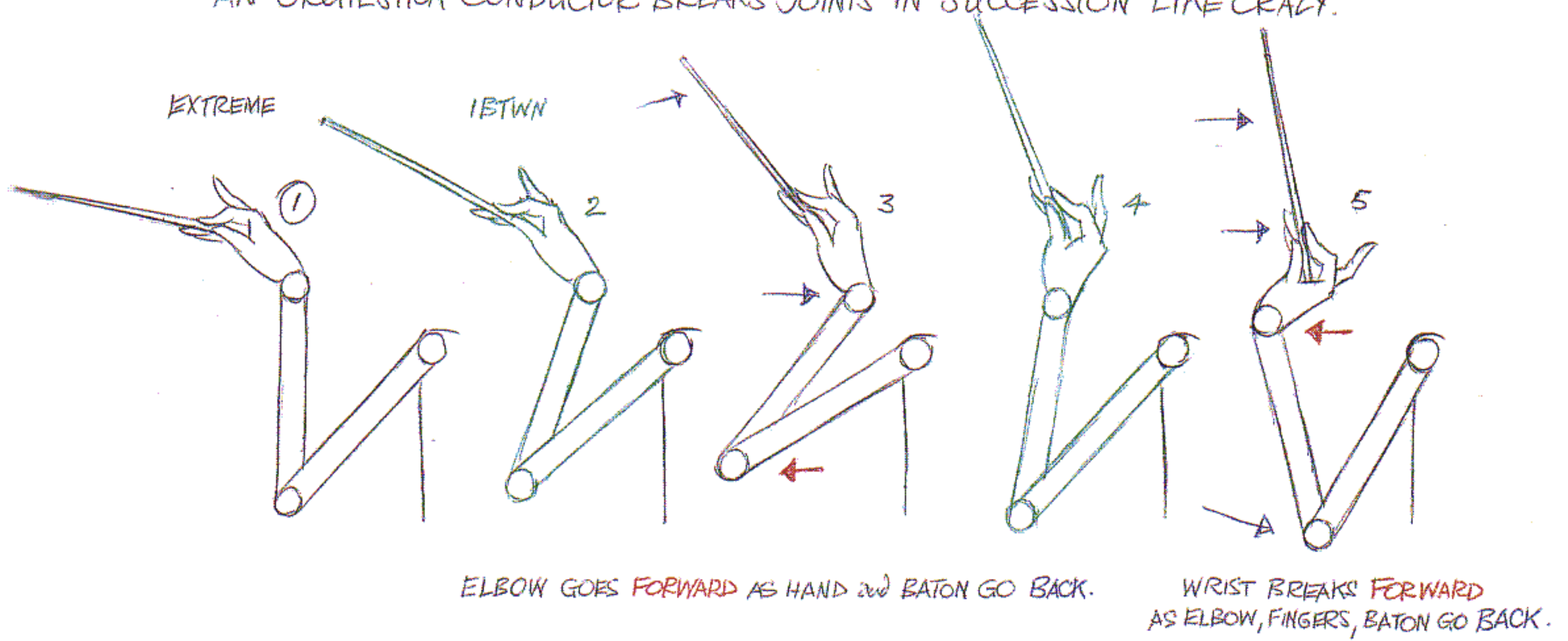
THIS IS THE PATTERN - THE IDEA -  
ITS NOT VERY GOOD SPACING -  
WHICH NEEDS MORE VARIETY.

RESULT: CURVACEOUS, UNFOLDING MOVEMENT - MADE WITH A RULER.

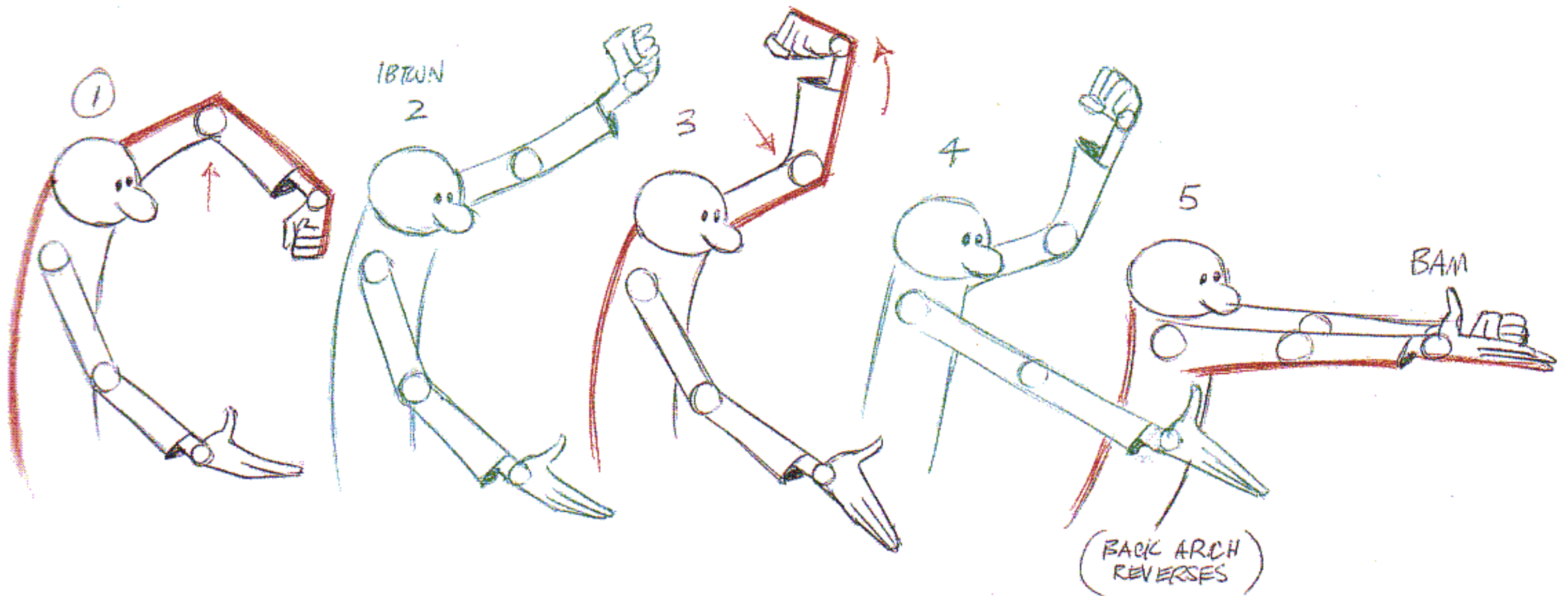




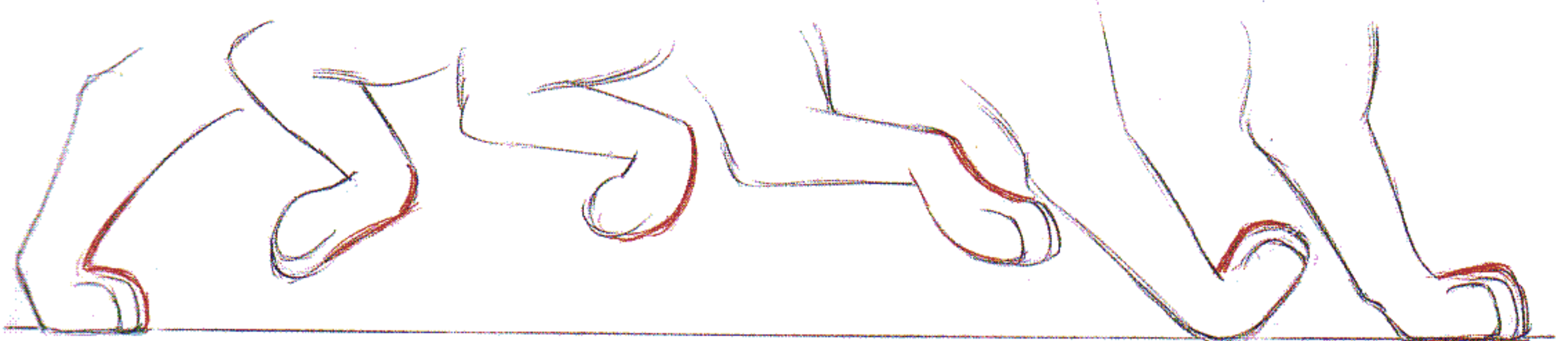
AN ORCHESTRA CONDUCTOR BREAKS JOINTS IN SUCCESSION LIKE CRAZY.



LET'S TAKE THE VERY BROAD ACTION OF A MAN SLAPPING OUT A MUSICAL BEAT.

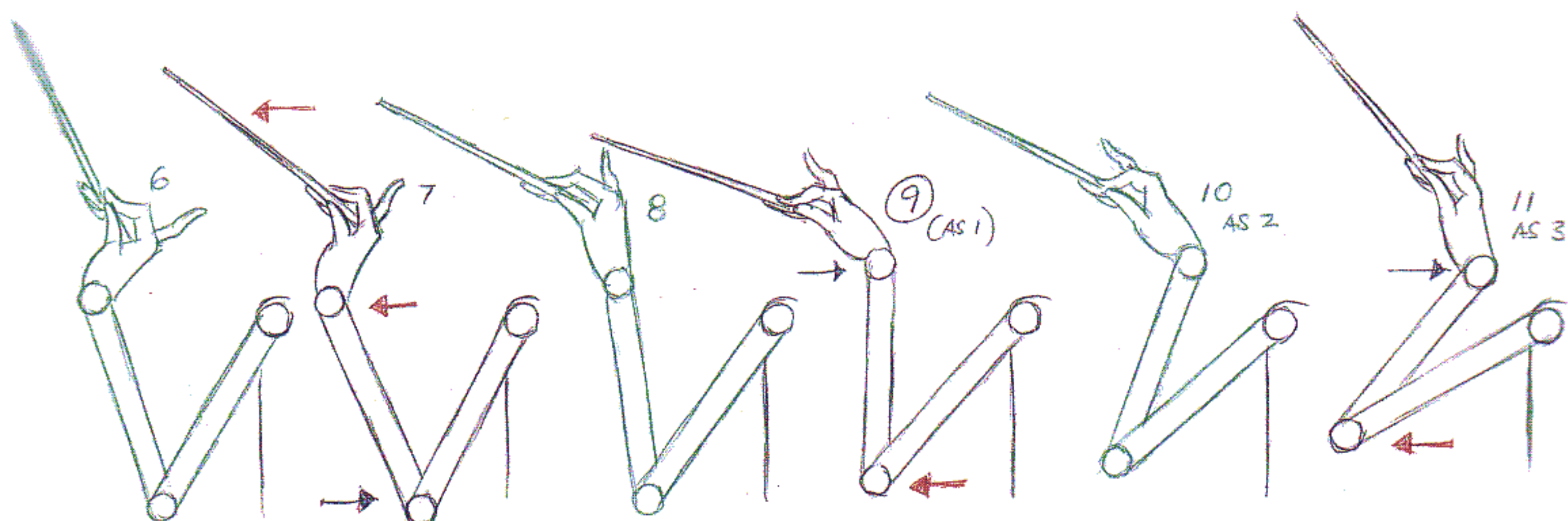


IT'S HAPPENING WITH A DOG'S FOOT -





AND THIS IS A REDUCED ACTION FOR A CONDUCTOR...



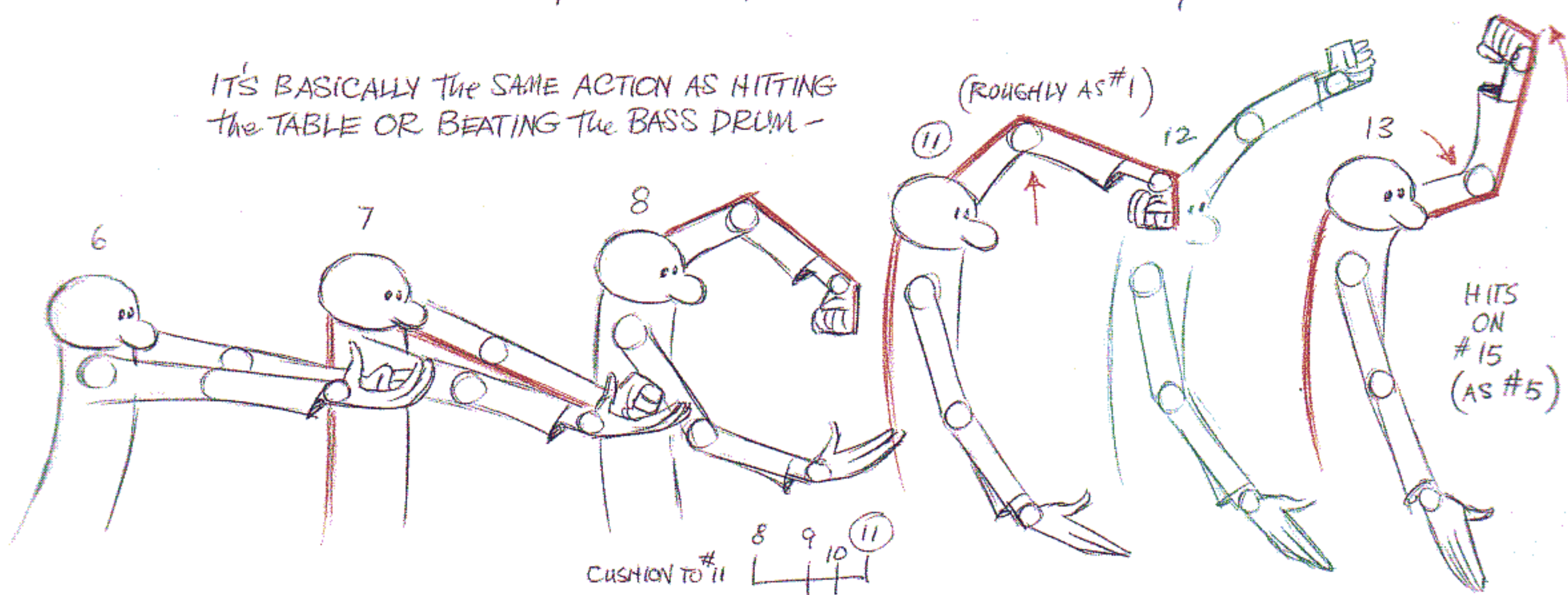
THEN ALL GOES FORWARD  
AS ELBOW GOES BACK FURTHER

WRIST BREAKS BACK AS FINGERS  
and BATON CONTINUE FORWARD  
and ELBOW STARTS FORWARD

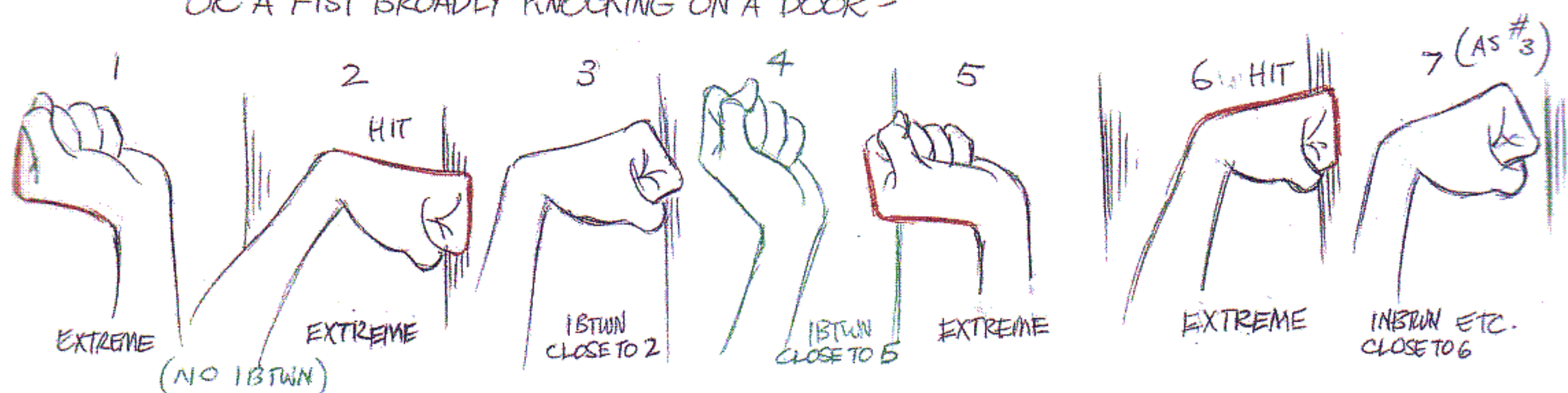
HAND and WRIST GO BACK  
AS ELBOW ARRIVES FORWARD

IT LOOKS COMPLICATED, BUT WHEN YOU START TO THINK THIS WAY, IT AIN'T.

IT'S BASICALLY THE SAME ACTION AS HITTING  
THE TABLE OR BEATING THE BASS DRUM -



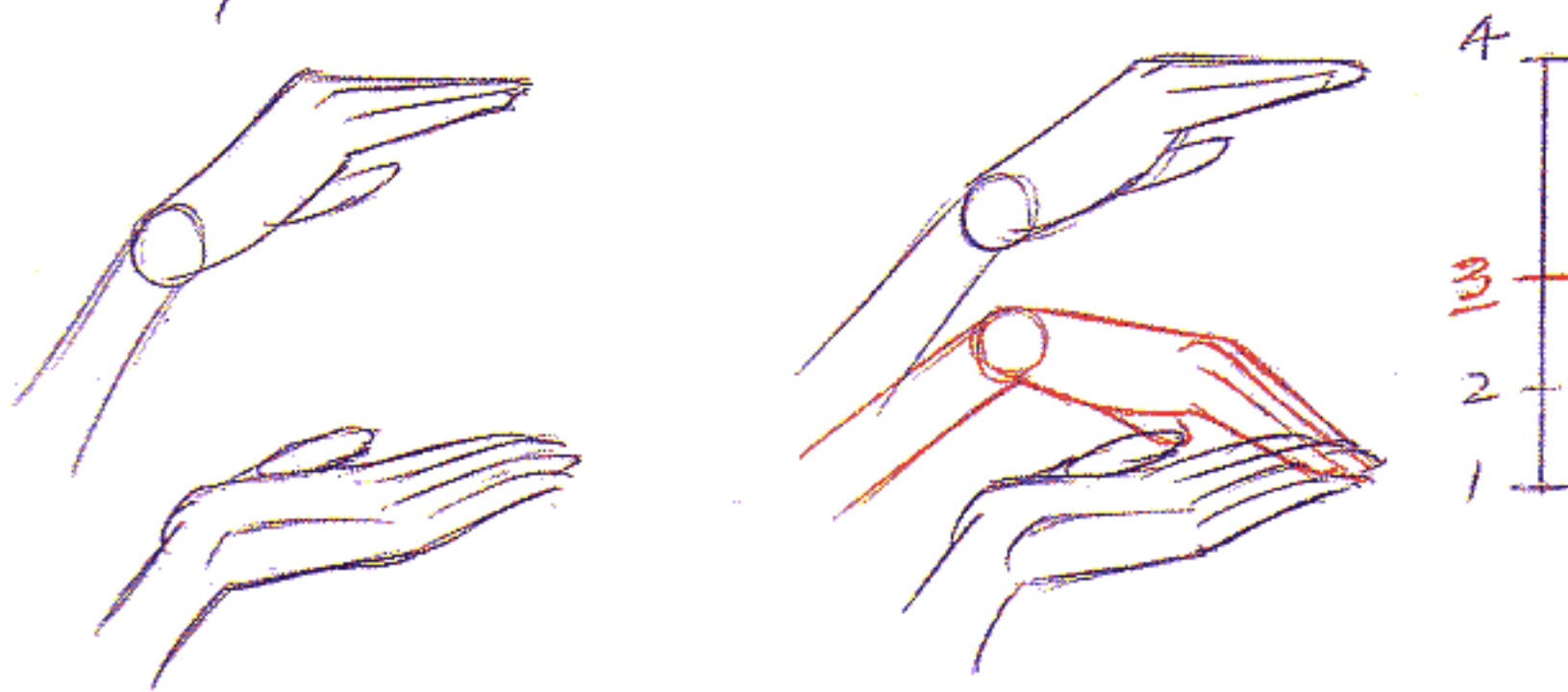
OR A FIST BROADLY KNOCKING ON A DOOR -



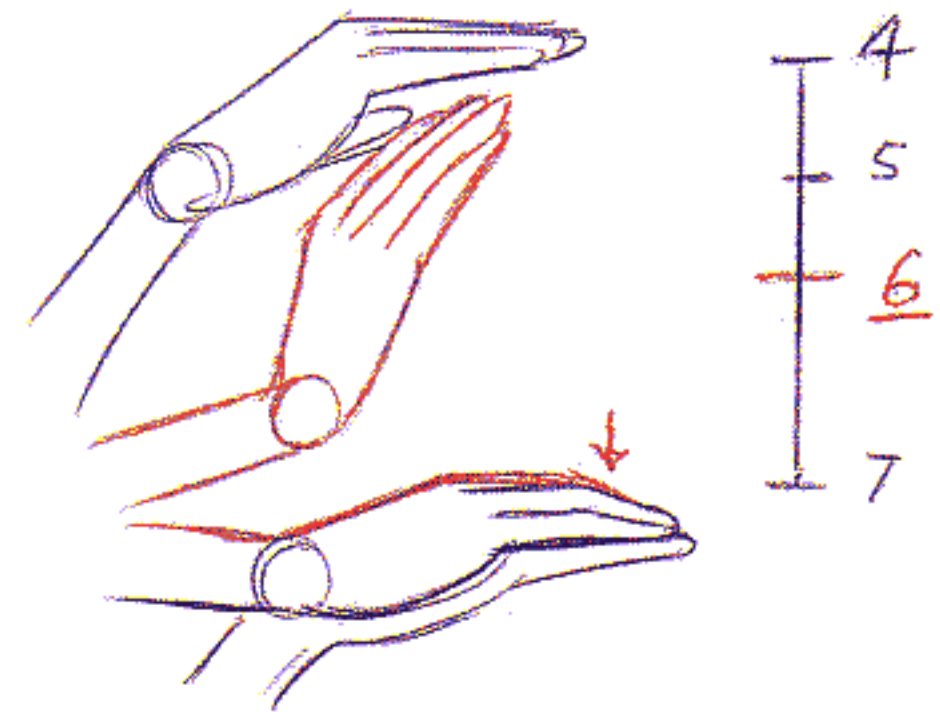


THERE ARE LOTS OF SIMPLE LITTLE ACTIONS WHICH CAN BE ENHANCED WITH JUST A TINY BIT OF FLEXIBILITY.

SAY, A HAND CLAPPING -



WRIST LEADS - TIP DRAGS GOING UP

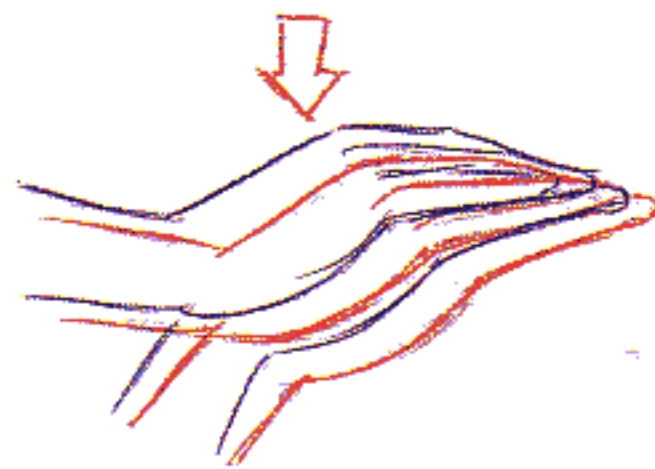


WRIST LEADS - TIP DRAGS GOING DOWN

ALSO, IT HELPS TO **DISPLACE** THE PALM SLIGHTLY **ON THE HIT**.

(**ON THE CONTACT** NOT AFTER THE HIT)

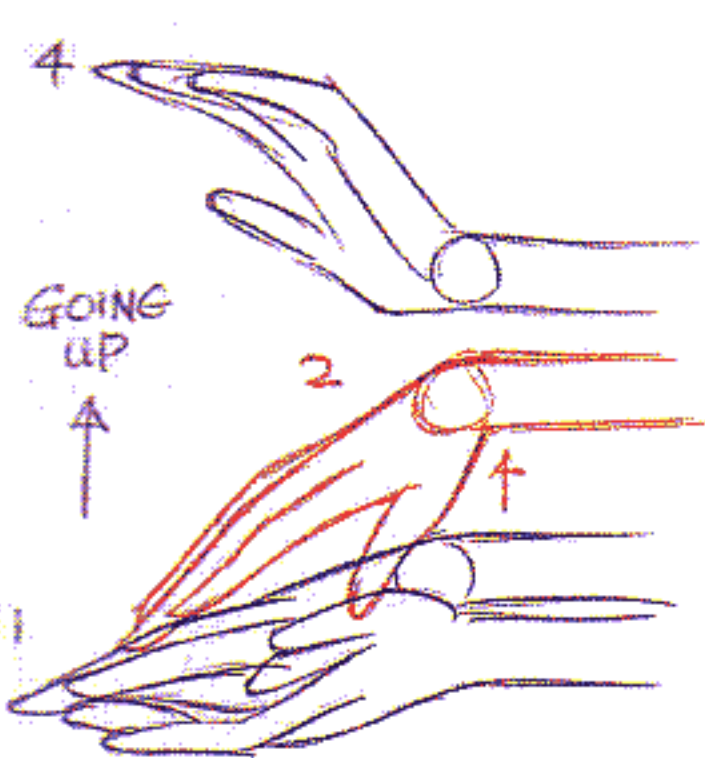
- DISPLACE THE HAND THAT'S BEING HIT SLIGHTLY.



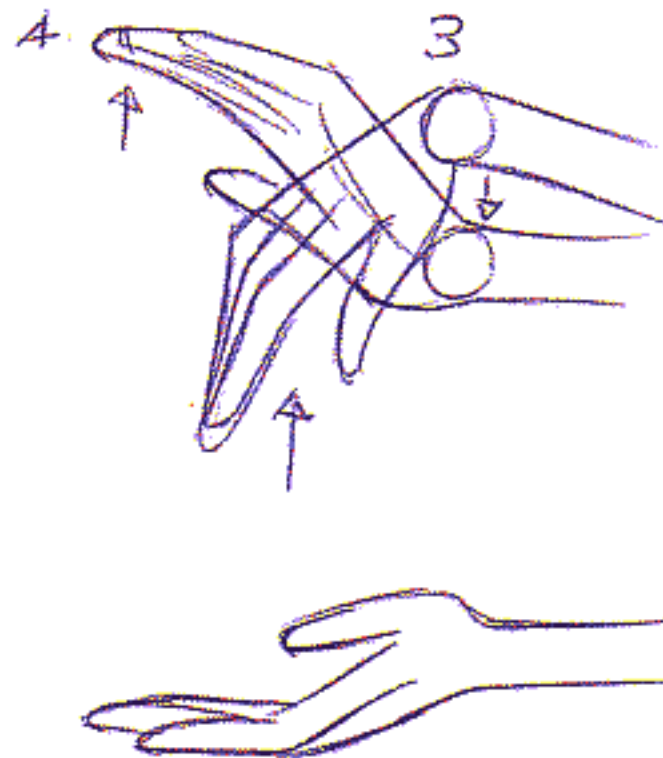
IF THE HAND STAYS IN THE SAME PLACE IT WILL LACK VITALITY.

WHAT WE **FEEL** IS THE DISPLACEMENT OF THE HIT.

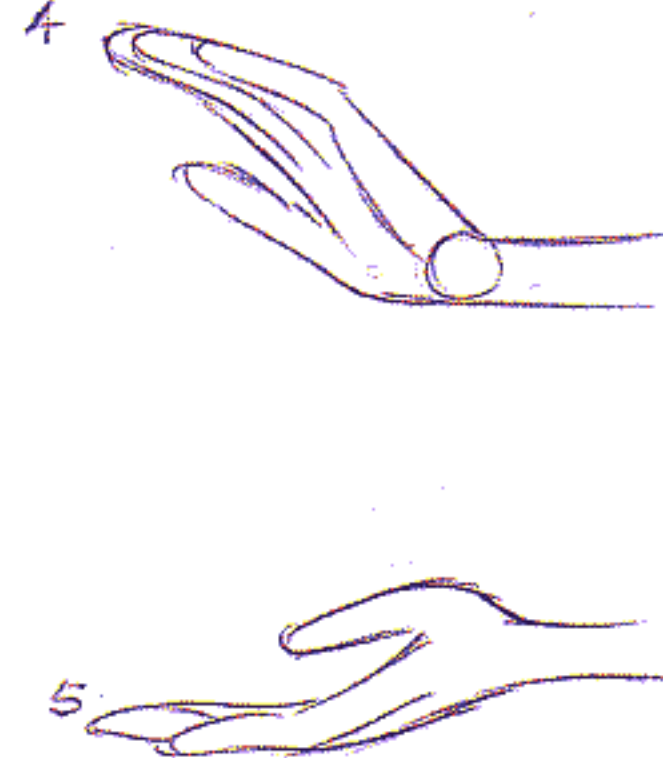
AGAIN, WE COULD DO THIS:



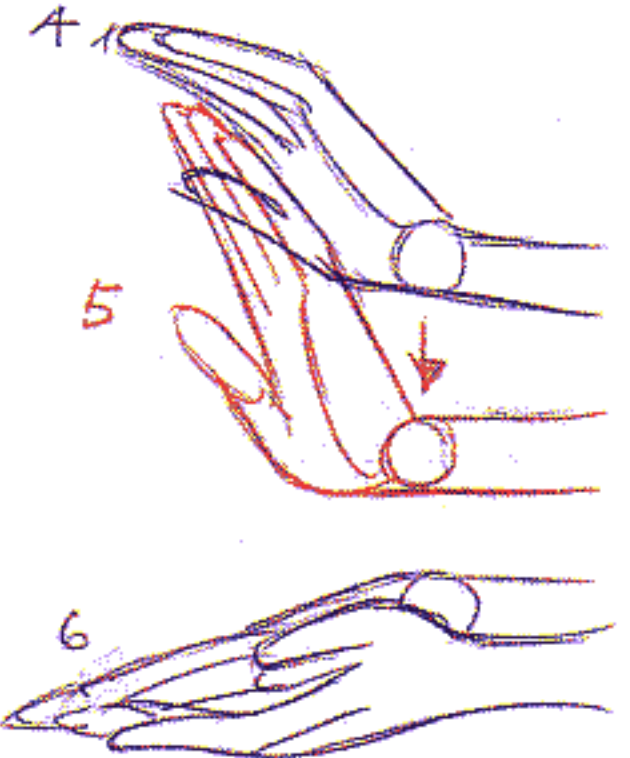
BREAKDOWN AS PREVIOUS



THE WRIST BREAKS AS THE FINGERS KEEP RISING

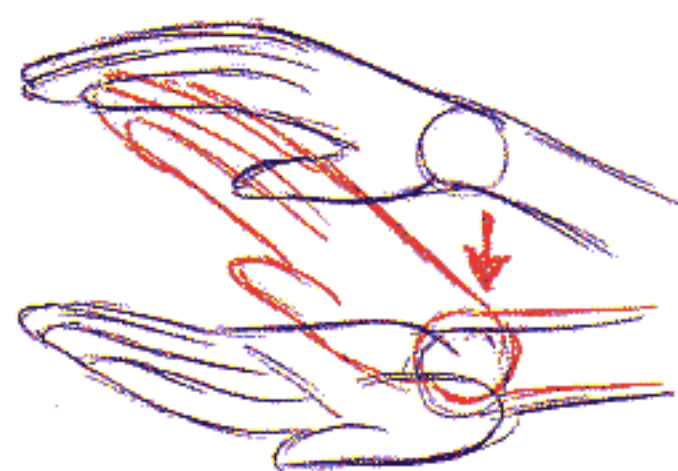
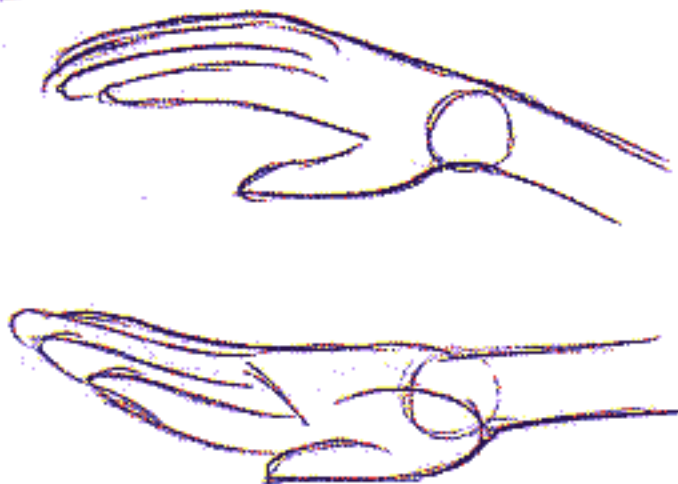


MAYBE HAVE **NO** IN BETWEEN GOING DOWN

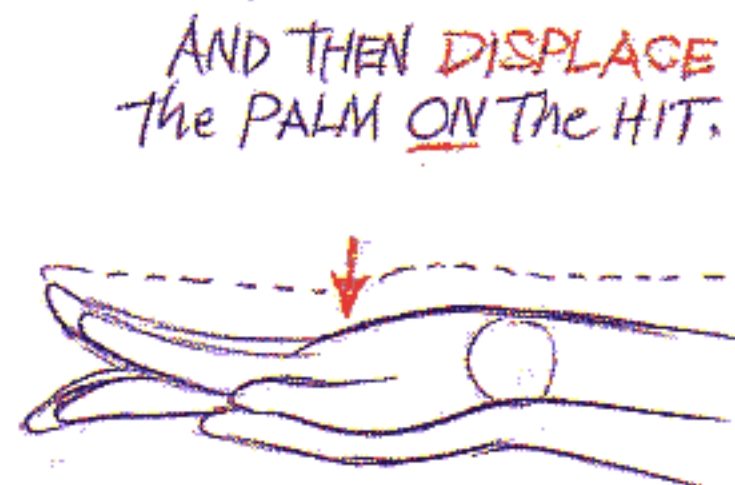


OR COULD HAVE ONE IN BETWEEN GOING DOWN

OR



WITH ONE IN BETWEEN THE WRIST COULD ARRIVE FIRST



AND THEN **DISPLACE** THE PALM **ON THE HIT**.



OF COURSE, APPLAUSE MAY BE LIKE THIS-  
SO WE'D DRAW IT THIS WAY, OBVIOUSLY-

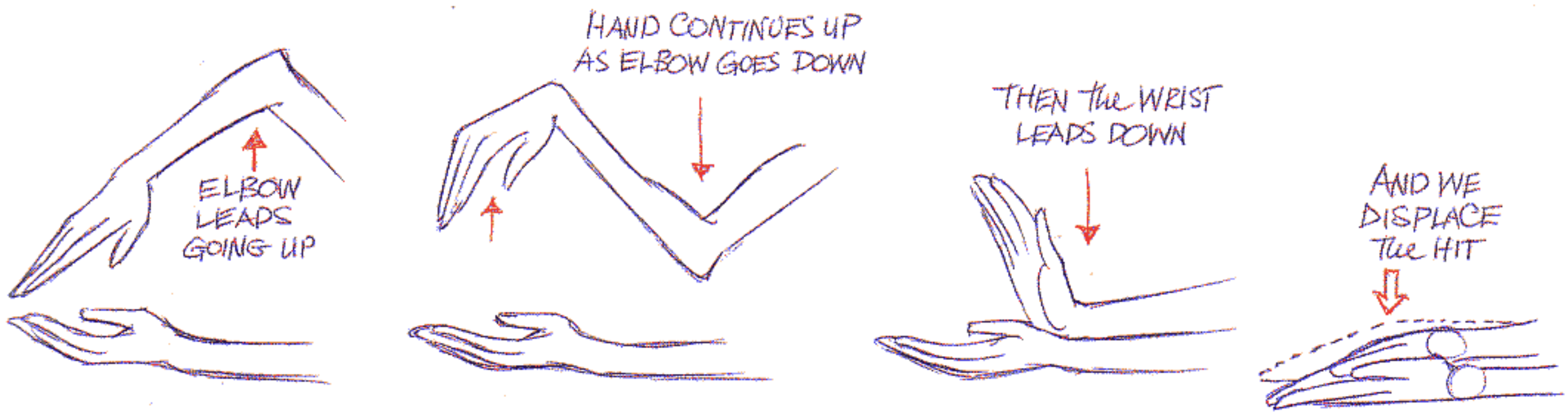


SPANISH FLAMENCO PERSON CLAPS  
DIFFERENTLY. TIPS OF FINGERS HIT PALM

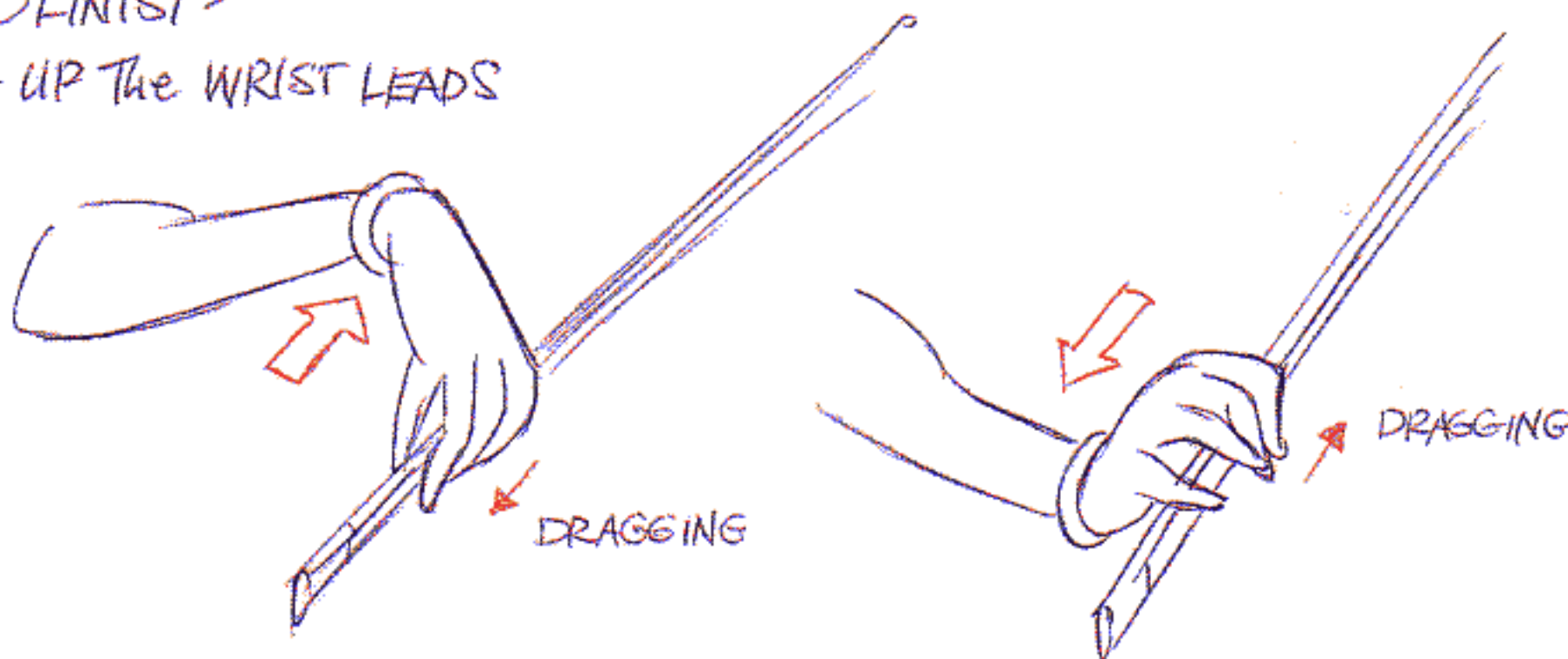


AND OBVIOUSLY A WRESTLER CLAPS DIFFERENTLY  
FROM A DRUNK OR A DIPLOMAT'S WIFE-OR A BABY.

BUT THE PRINCIPLE IS STILL THIS - A NUMBER OF JOINTS BREAKING, ONE AFTER ANOTHER.

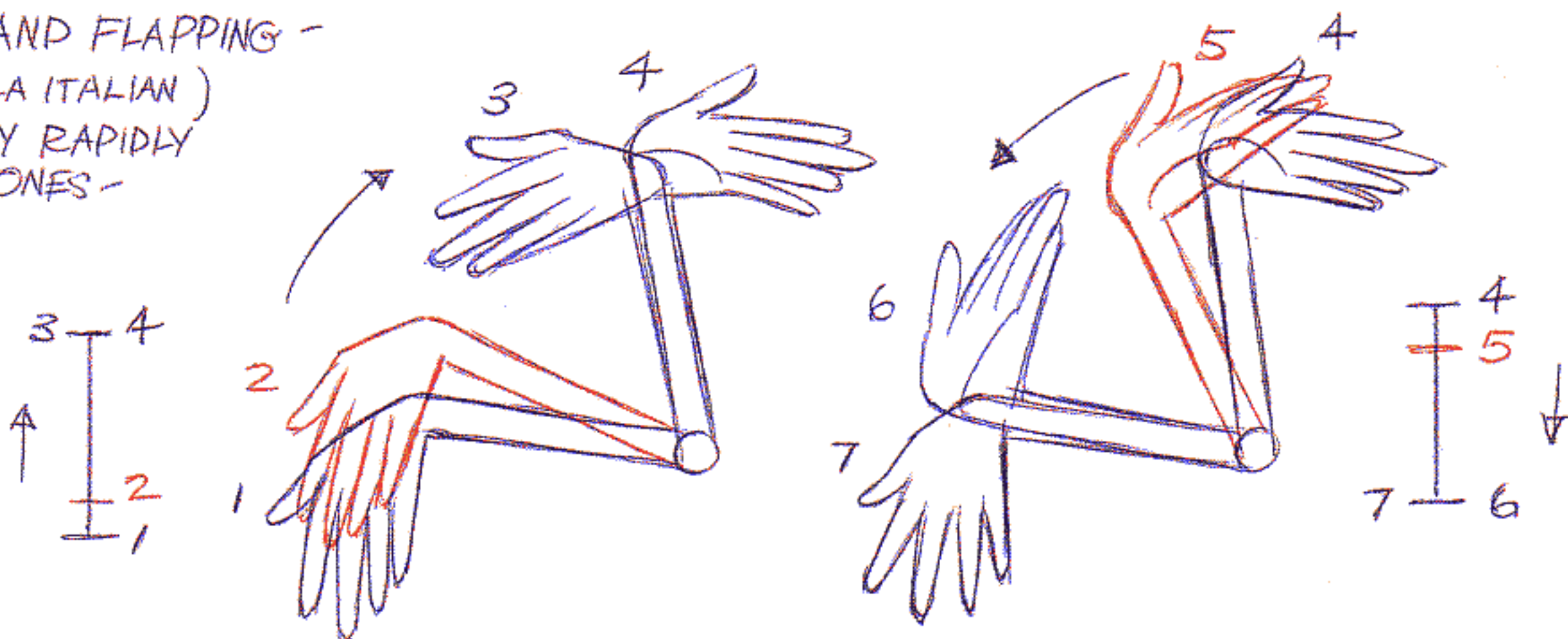


A VIOLINIST-  
GOING UP THE WRIST LEADS



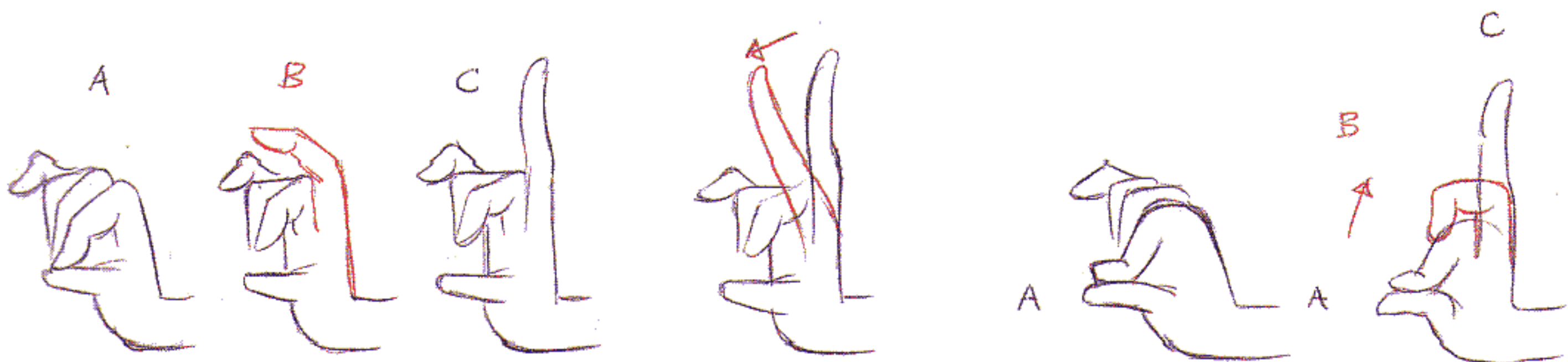
COMING DOWN  
THE WRIST STILL  
LEADS and the  
HAND DRAGS.

A HAND FLAPPING -  
(A LA ITALIAN)  
VERY RAPIDLY  
ON ONES -





EVEN IN A LITTLE THING LIKE THIS WE CAN GET FLEXIBILITY -



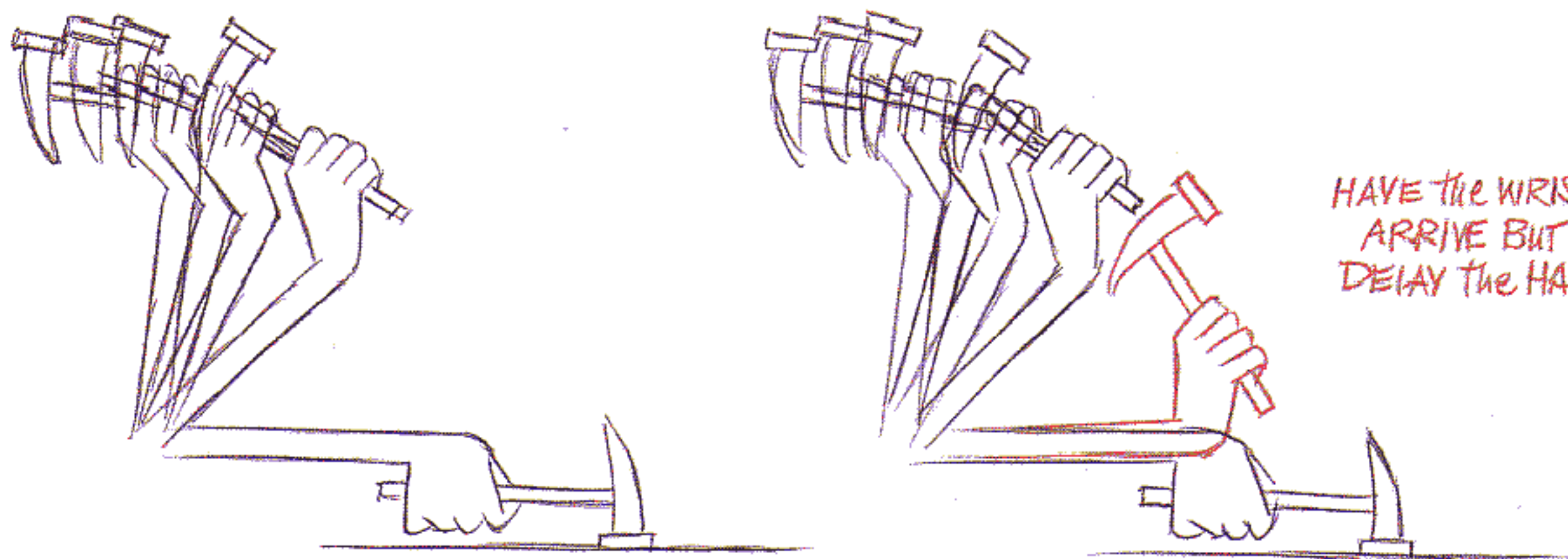
TO OPEN THESE FINGERS A STRAIGHT  
INBETWEEN GOING UP WOULD BE OK.

BUT ON THE WAY DOWN  
**DRAG** THE INBETWEEN

IF WE HAD A BETTER  
FEELING OF **CONTACT**  
AND **PRESSURE** TO BEGIN WITH -

= **BETTER GOING UP**  
WHEN THIS PRESSURE  
IS RELEASED.

SAY WE'RE HAMMERING A NAIL -

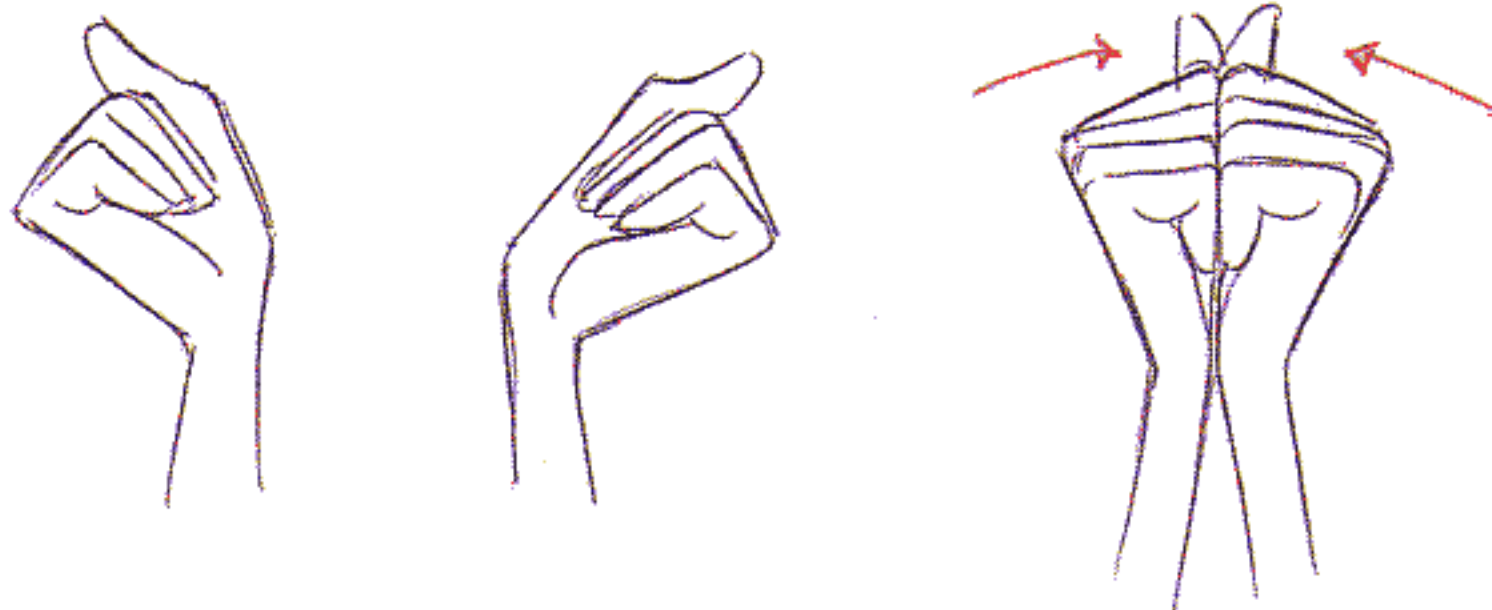


HAVE THE WRIST  
ARRIVE BUT  
DELAY THE HAND -

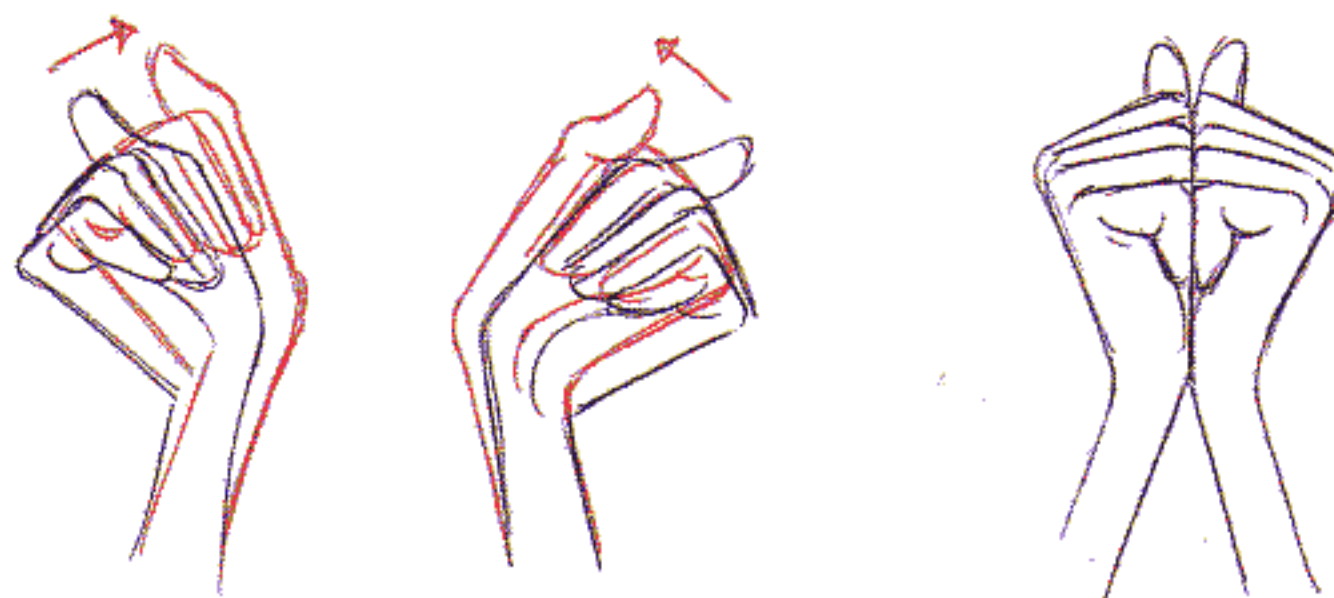
AGAIN, WE CAN TAKE ALL THIS TOO FAR.

BUT THE THING IS TO KNOW IT SO WE CAN USE IT WHEN WE WANT (WHICH WILL BE **A LOT.**)

TAKE SOMEONE'S HANDS  
KNOCKING TOGETHER  
GOING  
'GOODY, GOODY'



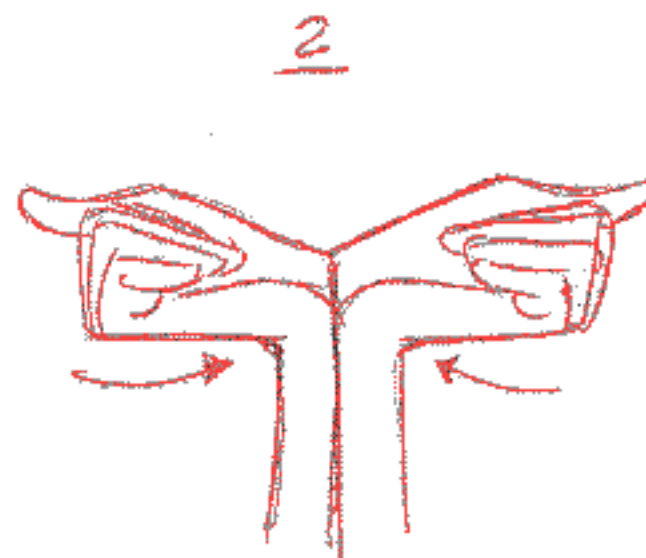
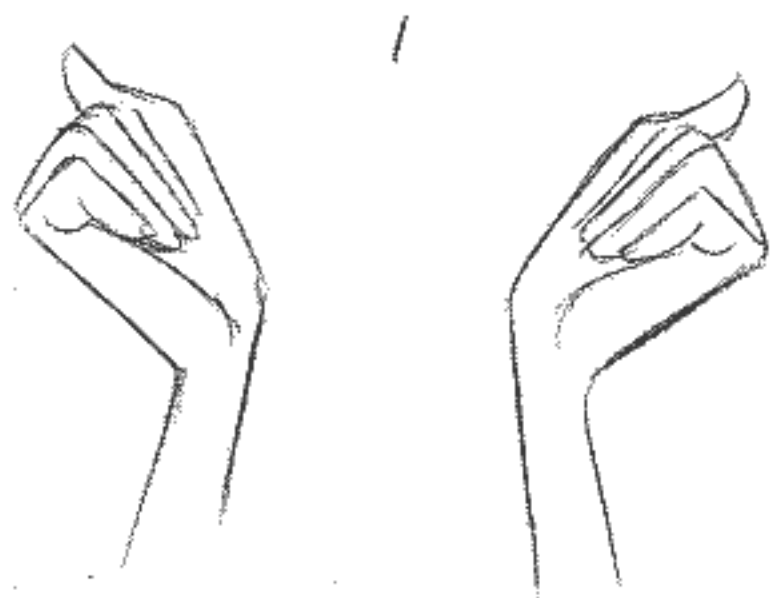
MAYBE WE JUST WANT  
TO INBETWEEN IT  
FAVOURING  
THE ANTICIPATE -



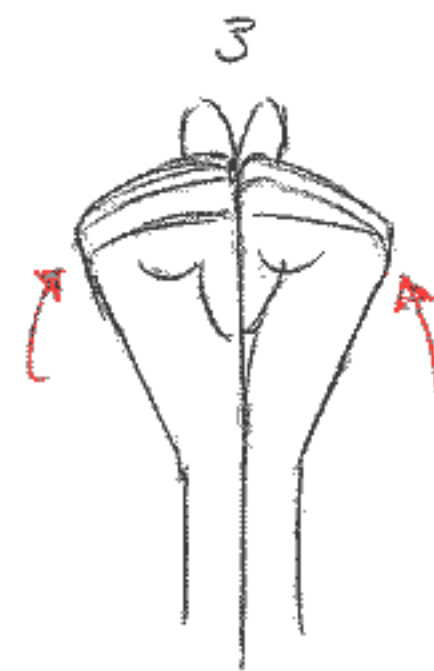
AND IT  
WOULD  
BE FINE -



IT MIGHT NOT BE NECESSARY TO 'OVERANIMATE' IT WITH BROKEN JOINTS - BUT MAYBE IT'S GOOD. LET'S TRY IT.

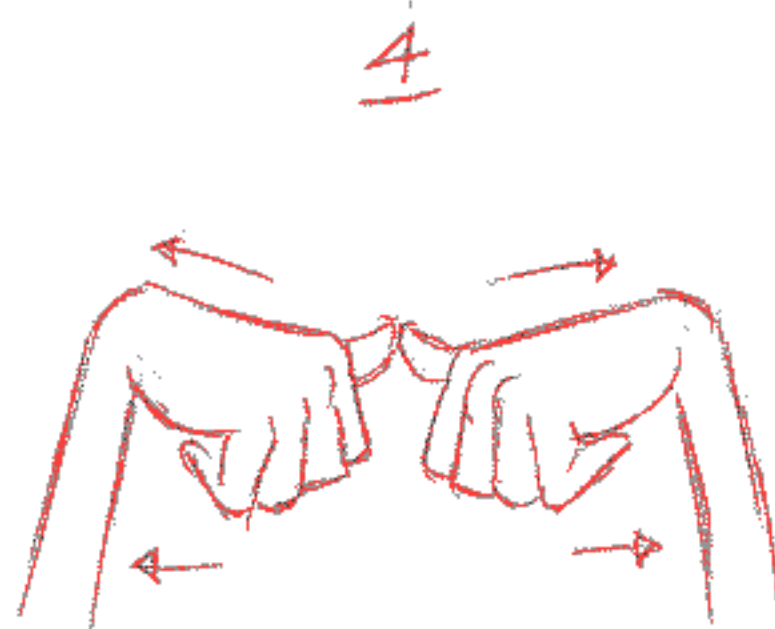
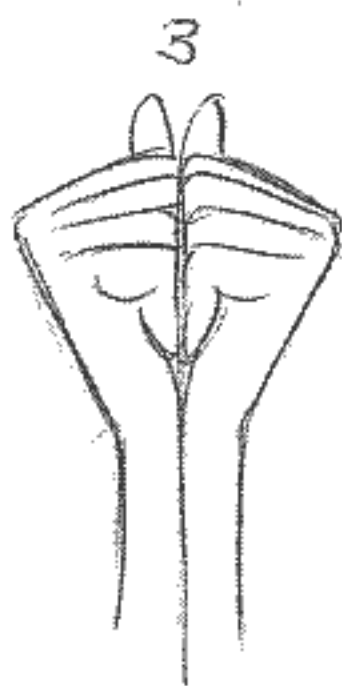


THE WRISTS LEAD  
CLUNK.

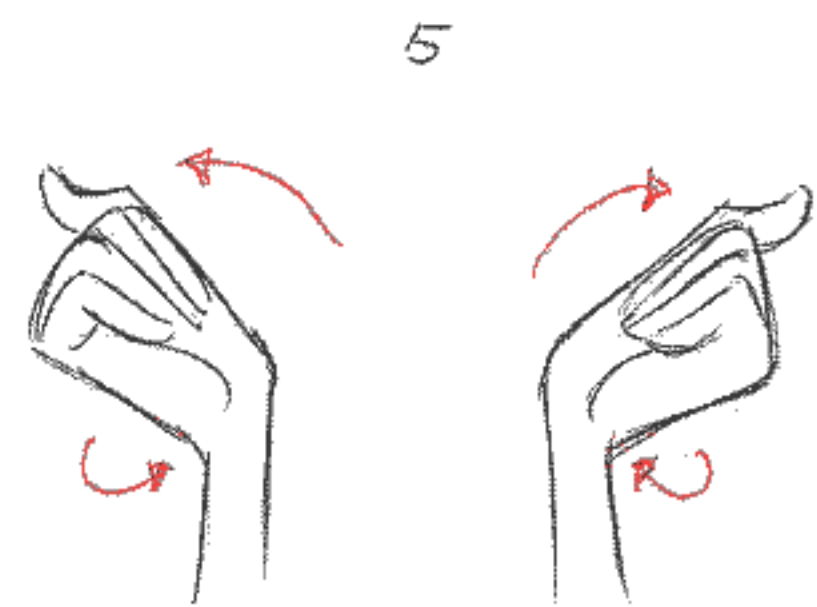


CLUNK.

NOW HOW ABOUT THIS FOR PULLING IT APART?

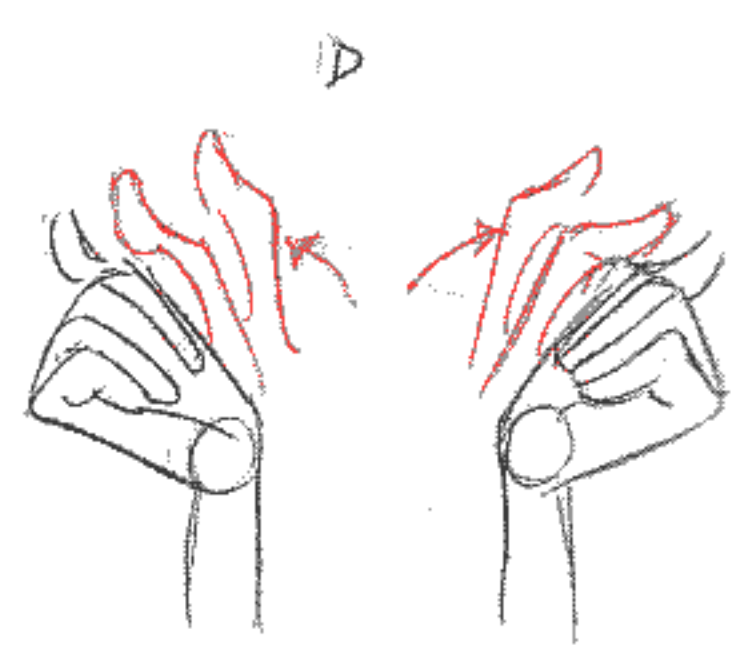
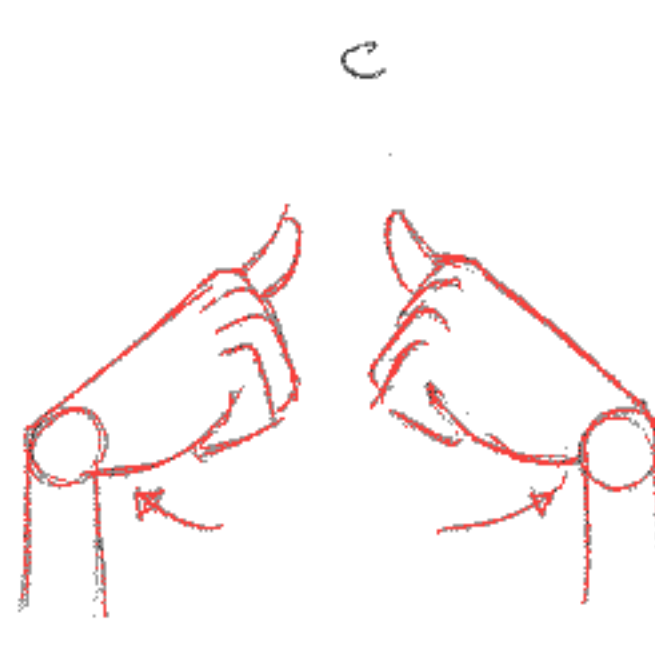
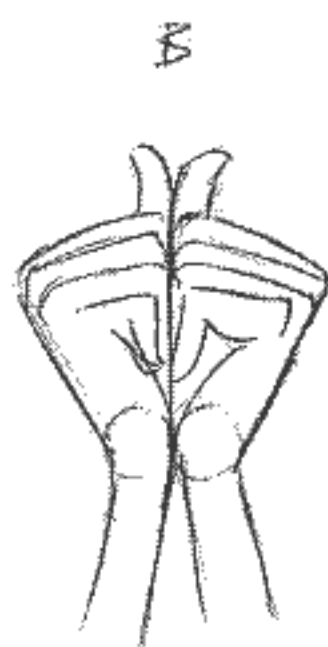


ELBOWS GO FIRST -  
THEN WRISTS LEAD OUT



AND COME IN A BIT  
AS HANDS FLOP OVER.

(OR) IT MIGHT BE NICE TO HAVE JUST ONE BREAK -



SO IT'S ALL A MATTER OF DEGREE -

WE'RE SHOWING THESE DEVICES AND PRINCIPLES IN THE RAW -  
IN THE CRUDEST POSSIBLE STATE TO MAKE IT CLEAR -  
TO LIMBER THINGS UP - TO STOP THINGS BEING STIFF OR STILTED.

WE CAN USE THEM INCREDIBLY **SUBTLY** OR OVERUSE THEM  
SO THINGS GO RUBBERY OR MUSHY.

BUT IT'S SURPRISING HOW FAR WE CAN GO WITH BREAKING JOINTS  
AND HAVE IT WORK BEAUTIFULLY.