CONTENTS

Contents and Cautions ……2
The Art of the Karakuri Master appears in Yumihiki Doji ……3
Parts in this Kit ……4
Assembling the Motive Power Unit ……7
Assembling the Driving Unit……11
Checking the Motion ……16
Assembling the Body of the Bow-Shooting Boy……18
Stringing ……21
Making Initial Adjustment of Strings ……29
Assembling the Arrow Holder and Installing It. ……38
Adjusting the Position of the Arrow Holder and the Right Arm……43
Testing the Bow-Shooting Motion ……45
Dressing the Doll in the Kimono and the Hakama and Setting the Shoji Screen…… 46
Assembling the Target……50
Regarding Pre-assembled product……52

To the Customer who purchased Pre-assembled Bow-Shooting Boy

Be sure to read the page 52 and 53.

⚠ CAUTION! ★Please read the following instructions before using this kit.

● Use caution when handling any metallic parts that are thin and sharp. Improper use may cause injury.

●To avoid the risk of suffocation, do not swallow small parts.

●Be careful not to point your hands and eyes with the screwdriver and the like in this kit to avoid injury.

●Be careful that your fingers are not caught in a machine while operating .

●Do not break up the mainspring. An inner tension spring may come loose and cause injury.

★Please read the assembly instructions and cautions in this booklet carefully before use. Do not use the parts that are broken or deformed while in use.

★The colors may fade out of the Kimonos when it is exposed to the sun. Keep the doll with care.

★Do not wash the Kimonos with whites. The colors may be washed off and stain whites.

●The plastic materials used in this kit

face (white) :HIPS **top panel, base panel, and hands** : ABS resin **side panels, shoji screens, body, arrow holder, target, little Chinese doll and the like (black and brown)** : HIPS **wheels, springs, arrows (white brown)** :POM **small bags** : PO, PE

✳When disposing of the kit, please follow the recycling regulations in your area.

The Art of the Karakuri Master that appears in Yumihiki Doji

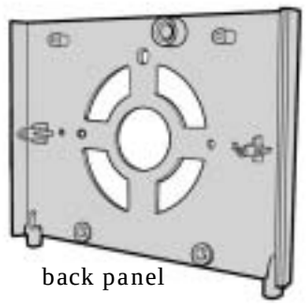
Yumihiki Doji (original Bow-Shooting Boy) is often called "The masterpiece of Karakuri* Dolls". The art of a master craftsman is alive in this piece of work made by Tanaka Hisashige, popularly known as Karakuri Giuemon who was an outstanding scientist in the late Edo period.

The people at that time must have gazed with breathless interest at such smooth movements as taking an arrow from the arrow holder, putting it to the bow, and shooting the target. This Bow-Shooting Boy kit reproduces the mechanism and movement of the original Yumihiki Doji so that anyone can enjoy assembling. Please enjoy the wonderful techniques performed with simple combination of a mainspring, wheels and cams.

✳"Karakuri" means the mechanism that drives a machine.

Parts in this Kit


mainspring


back panel


switch spring


switch


reverse rotation stopper C


inside panel


shaft


reverse rotation stopper B

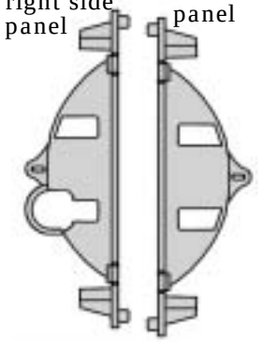

reverse rotation stopper A


cam 1


large wheel


rotary wheel A


rotary wheel B


right side panel

left side panel

(view from the top when the parts stand)


cam 2


cam 3


cam 4


cam 5


cam 6


cam 7


cam plate 1


cam plate2


cam plate3

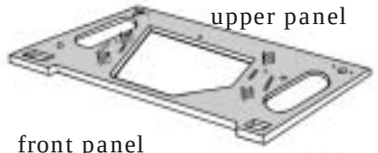

cam plate4

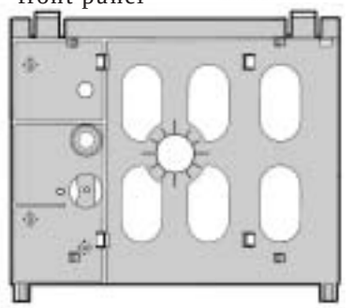

cam plate5


cam plate6


cam plate7

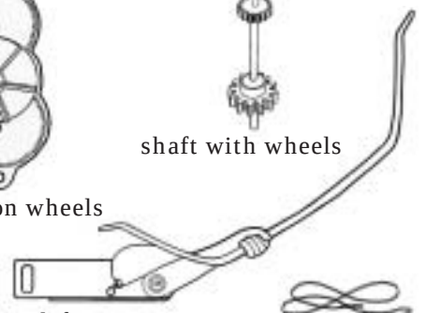
※Please note that shapes of each cam may appear slightly different from the illustrations.


upper panel


front panel

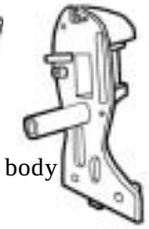

combination wheels


shaft with wheels

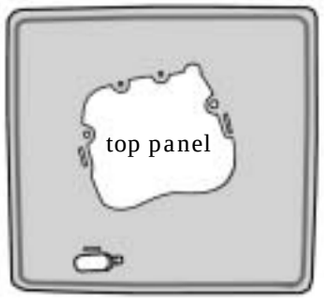

left arm


bowstring


right body


left body


shoulder piece


top panel

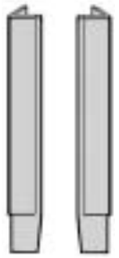

neck spring

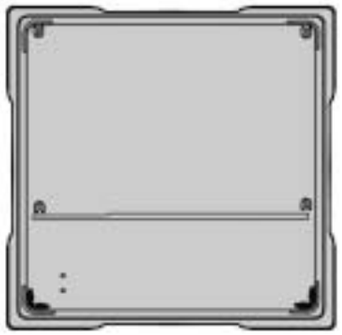

arrow holding fan


fan holder


fan holding shaft


fan stand


post (2)


base panel


little Chinese doll


dial


fan stand stopper


weight (2)


pulley


upper body frame

head

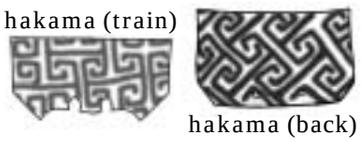

※Do not dispose the cover.


kimono


hakama (front)


lower body (front)


lower body (back)


hakama (train)

hakama (back)

both sides adhesive tape


string for the target


target drum


brocade


arrow (8)


small shoji screen

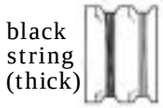

middle shoji screen (2)


large shoji screen


target post (2)

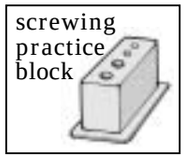

target beam


target base (2)


black string (thick)

transparent string (fine)


arrow stand


screwing practice block


tassel (2)


target base connector

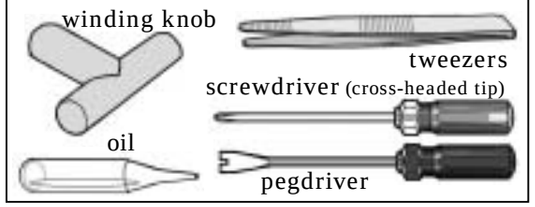
A Variety of Screws and Nut to be Used for Assembling

A: Six 2-by-6 mm self-tapping screws with collars	B: Eleven 2-by-10 mm self-tapping screws with collars	
C: Four 2-by-8 mm self-tapping screws	D: One 2-by-12 mm self-tapping screw	
E: Fourteen 3-by-8 mm self-tapping screws	F: One 3-by-10 mm screw	One hexagon nut

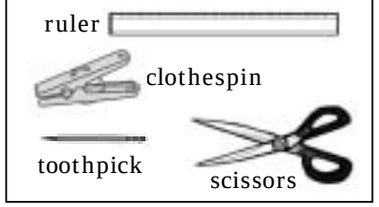
Notice

1.Regarding self-tapping screws: Unlike ordinary screws, self-tapping screws (from screw A through E) are those that get in the holes by carving spirals by themselves. Push and screw them in strongly. Also, intervals of screw threads are wider than those of ordinary screws. Be sure to use correct screws.
2. Regarding the number of screws: The number of each screw written above shows the number that is actually used. There are some extra screws included in the kit for spare.

Tools supplied in this kit

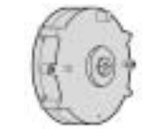

winding knob
tweezers
screwdriver (cross-headed tip)
oil
pegdriver

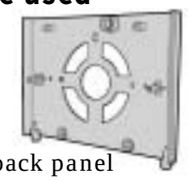
Things you will need


ruler
clothespin
toothpick
scissors

Assembling the Motive Power Unit

●Parts to be used


mainspring


back panel


inside panel


reverse rotation stopper A


reverse rotation stopper B


reverse rotation stopper C


rotary wheel A


rotary wheel B


switch spring


switch

shaft


large wheel


cam 1


right side panel


left side panel

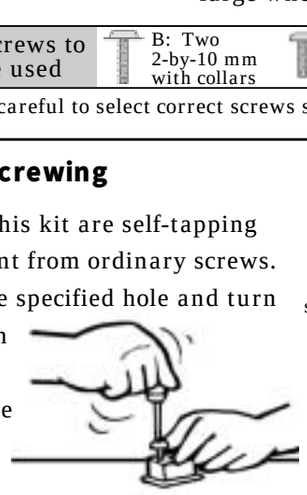

screwing practice block

Screws to be used	B: Two 2-by-10 mm with collars	C: One 2-by-8 mm	E: Six 3-by-8 mm

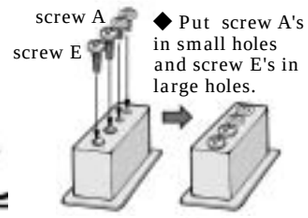
※Be careful to select correct screws since all the screws look similar.

How to Practice Screwing

Most of the screws in this kit are self-tapping screws that are different from ordinary screws. Press one lightly on the specified hole and turn it with the driver. Then it curves a groove and screws in.First, practice how to screw this type of screws.

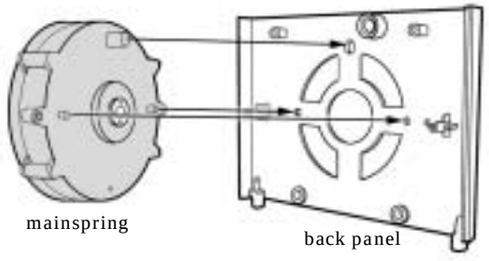


Screw the self-tapping screws in the holes of the screwing practice block.

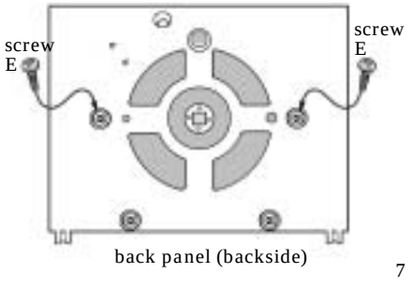


screwing practice block

1 Insert the projections of the mainspring into the holes in the back panel.

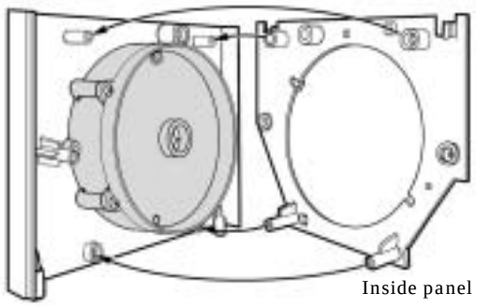

mainspring
back panel

2 Fix the mainspring from the backside of the back panel with two screw E's.



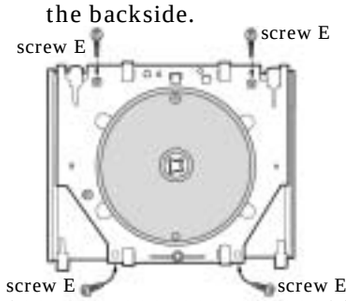
back panel (backside)

3 Put the inside panel on the mainspring.



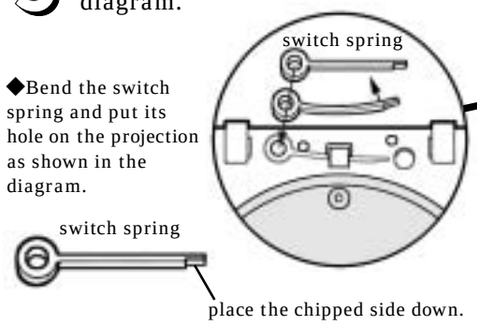
●Pay attention to the direction!

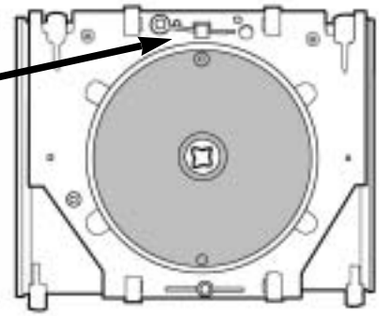
4 Attach the inside panel with four screw E's. Two of them are attached from the front side and the other two from the backside.



5 Set the switch spring on the inside panel in the direction shown in the diagram.

◆Bend the switch spring and put its hole on the projection as shown in the diagram.

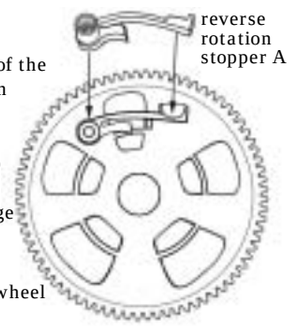




●Pay attention to the direction of the parts!

6 Attach the reverse rotation stopper A to the large wheel.

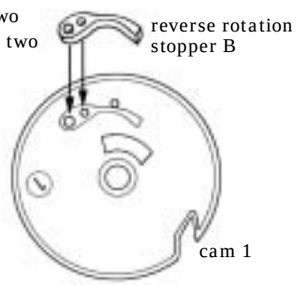
◆Set the hole of the reverse rotation stopper on the projection and push up the tip to catch the hook of the large wheel.



●Pay attention to the direction of the parts!

7 Attach the reverse rotation stopper B to the cam 1.

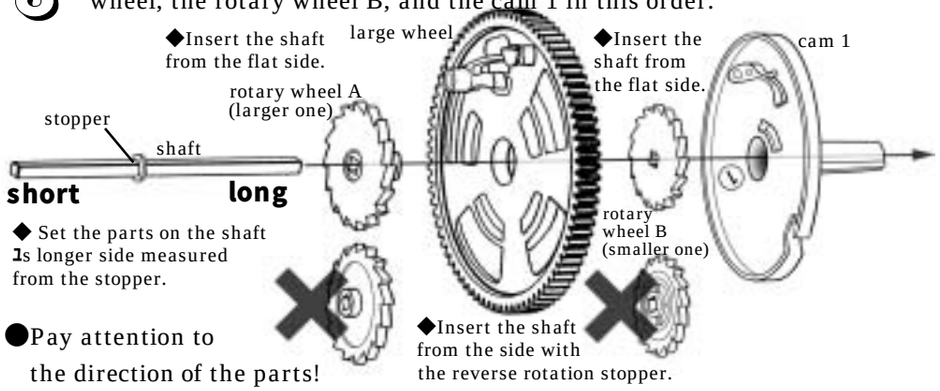
◆ Set the two holes on the two projections.



●Pay attention to the direction of the parts!

8 Put the longer side of the shaft into the rotary wheel A, the large wheel, the rotary wheel B, and the cam 1 in this order.

◆Insert the shaft from the flat side.



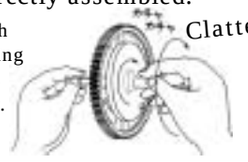
◆ Set the parts on the shaft as longer side measured from the stopper.

●Pay attention to the direction of the parts!

◆Insert the shaft from the side with the reverse rotation stopper.

CHECK Hold the wheels as shown in the diagram below and turn the cam 1. If it turns only to the arrow direction, it is correctly assembled.

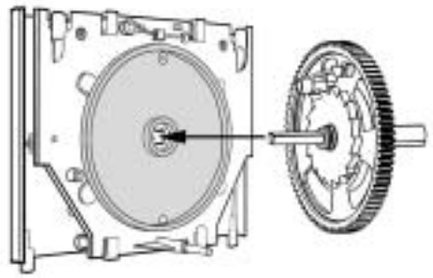
◆Push from both sides while turning so that the parts don't come apart.



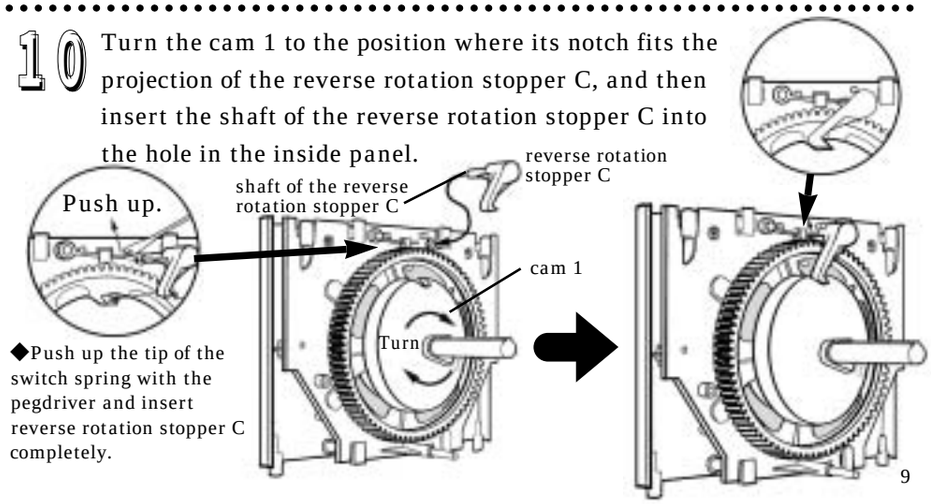
※If it doesn't go well, assemble them again according to the diagram above at 8.

9 Insert the shaft into the hole in the mainspring.

◆Be careful not the combined parts to come apart.

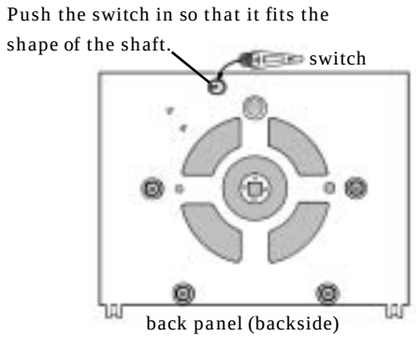


10 Turn the cam 1 to the position where its notch fits the projection of the reverse rotation stopper C, and then insert the shaft of the reverse rotation stopper C into the hole in the inside panel.

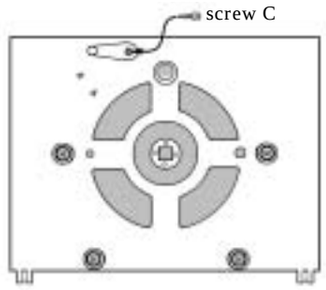


◆Push up the tip of the switch spring with the pegdriver and insert reverse rotation stopper C completely.

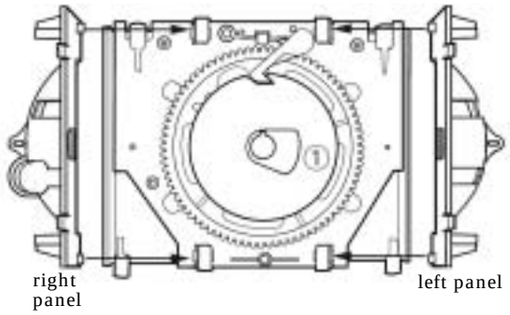
11 Hold the reverse rotation stopper C and set the switch on the shaft of the stopper from the opposite side.



12 Fasten the switch with a screw C.

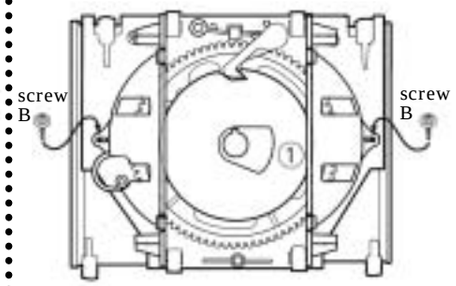


13 Set the right and left panels on the inside panel.

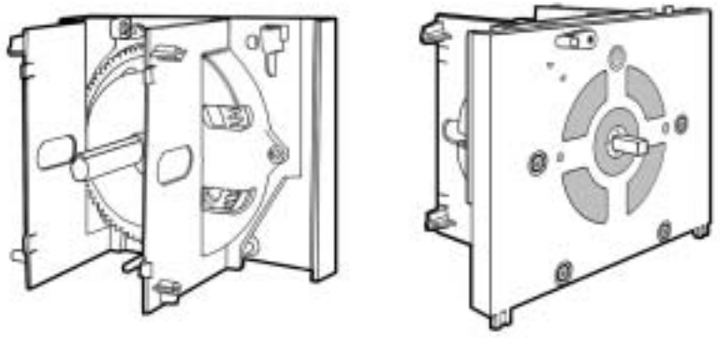


●Be careful not to mistake the side.

14 Fasten the right and left panels with screw B's.

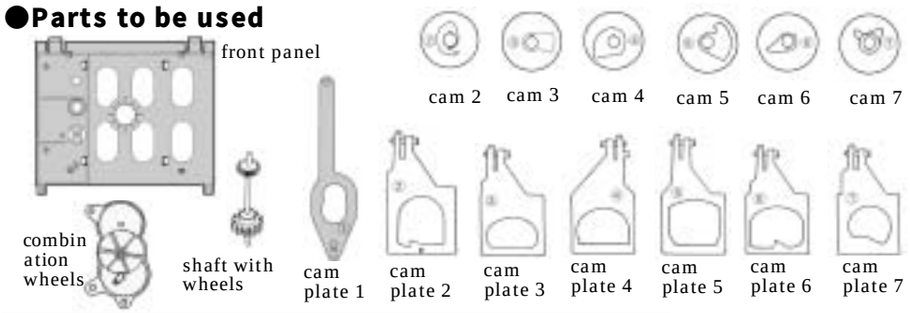


[The diagram of the assembly so far]

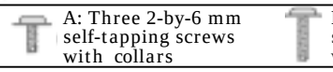


Assembling the Driving Unit

●Parts to be used

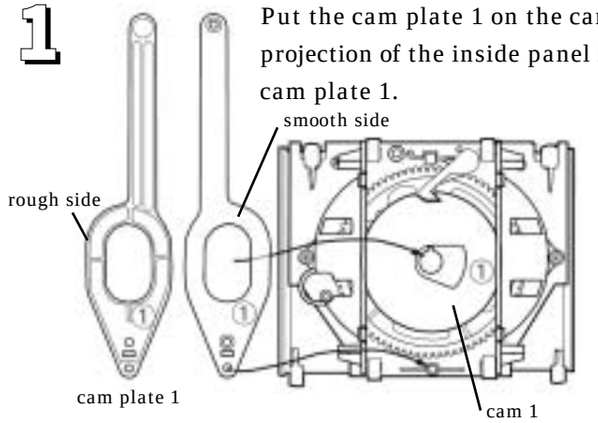


Screws to be used



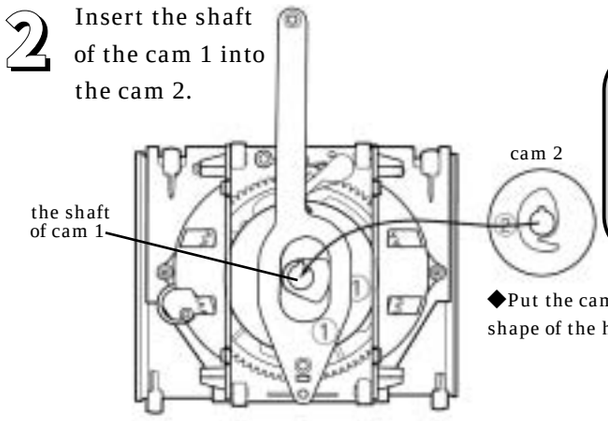
※Be careful to select correct screws since all the screws look similar.

1 Put the cam plate 1 on the cam 1 inserting the projection of the inside panel into the lower hole in the cam plate 1.



Important
Put on all the cam plates so that their smooth sides are shown.

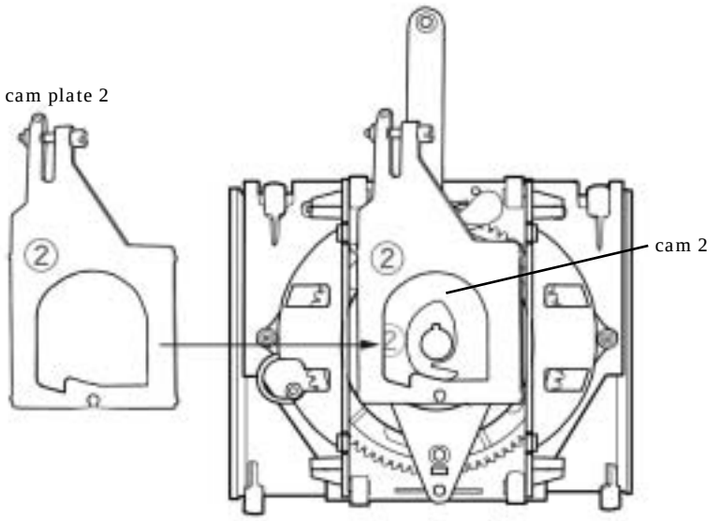
2 Insert the shaft of the cam 1 into the cam 2.



◆Put the cam on so that the shape of the hole fits the shaft.

Important
Put on all the cams so that their projecting sides are shown.

3 Put the cam plate 2 on the cam 2

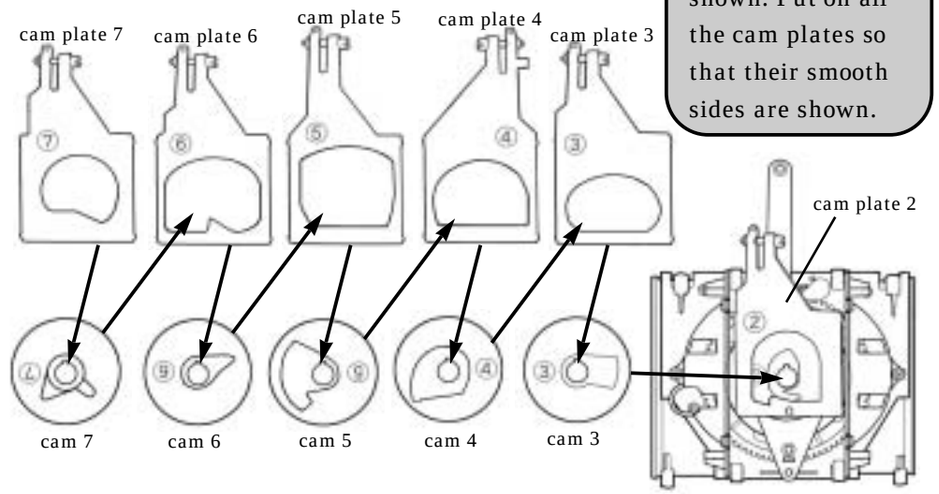


4 Put cams 3~7 and cam plates 3~7 on the cam plate 2 by turns.

◆On the cam plate 2, put the cam 3, then the cam plate 3, the cam 4, the cam plate 4, the cam 5, the cam plate 5, the cam 6, the cam plate 6, the cam 7, and the cam plate 7 in this order.

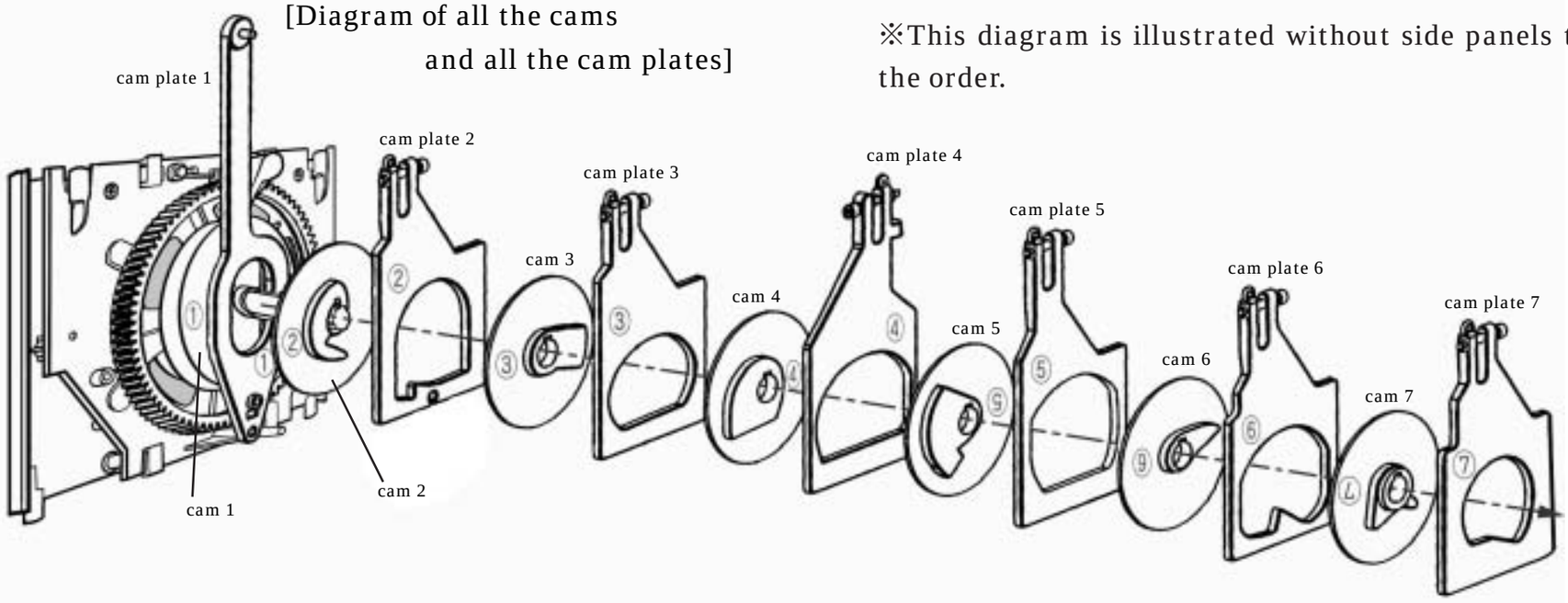
Important

Put on all the cams so that their projecting sides are shown. Put on all the cam plates so that their smooth sides are shown.



[Diagram of all the cams and all the cam plates]

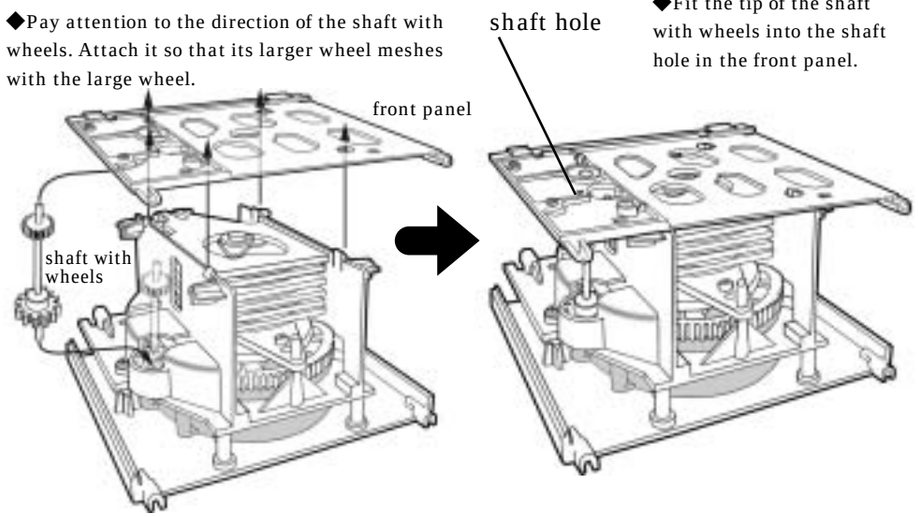
※This diagram is illustrated without side panels to clarify the order.



5 Set the shaft with wheels in the opening in the right side panel and then put on the front panel so that its shaft hole fits the shaft with wheels. Push the projections of the right and left side panels into the four holes in the front panel firmly.

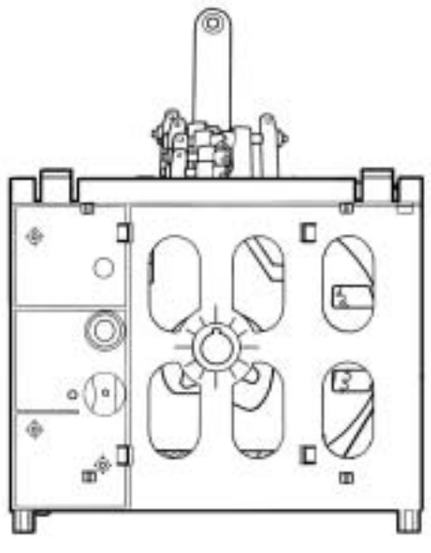
◆Pay attention to the direction of the shaft with wheels. Attach it so that its larger wheel meshes with the large wheel.

◆Fit the tip of the shaft with wheels into the shaft hole in the front panel.



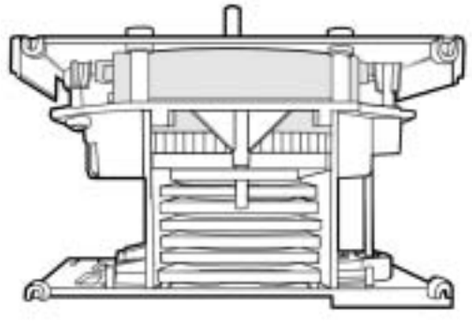
[The diagram of the assembly so far]

side view



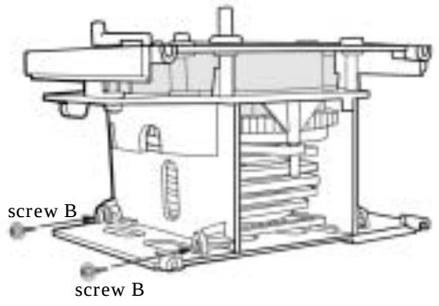
Check if each part fits like these diagrams.

bottom view

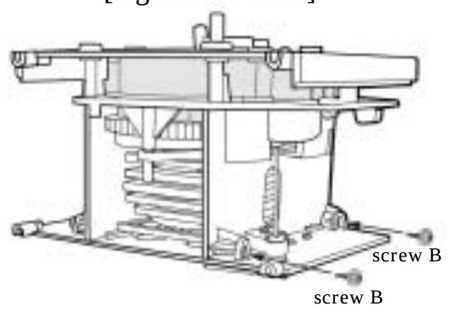


6 Fasten the front panel with screw B's at two points each to the right and the left panels.

[left side view]

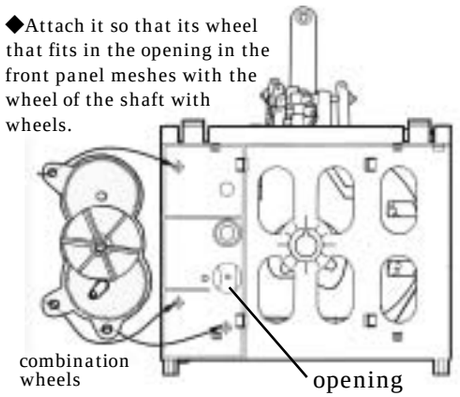


[right side view]

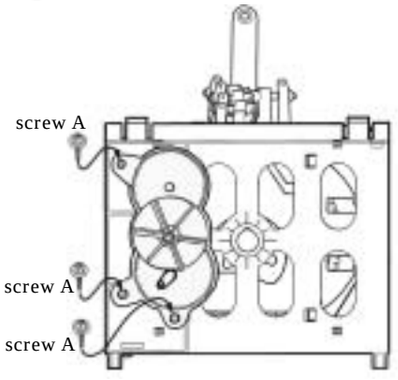


7 Attach the combination wheel to the front panel. (Push it in completely.)

◆Attach it so that its wheel that fits in the opening in the front panel meshes with the wheel of the shaft with wheels.

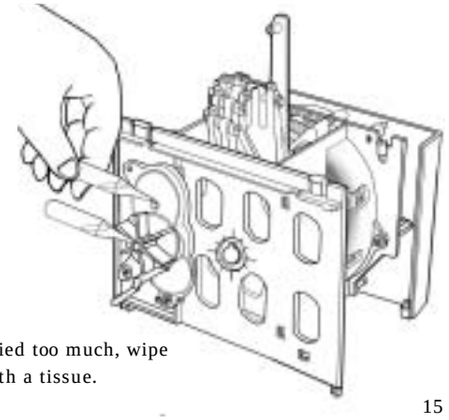


8 Fasten the combination wheel with three screw A's.



9 Oil a little the two shafts (metallic parts) of the combination wheels.

◆Cut off the tip of the oil syringe two or three mm. Stick a toothpick in the syringe to avoid leaking after use.

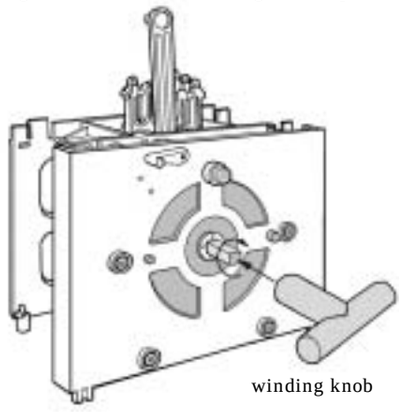


◆If the oil is applied too much, wipe off the extra oil with a tissue.

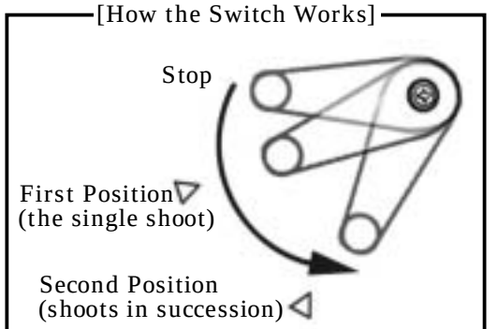
Checking the Motion of the Unit

Wind the mainspring and check that the cam plates move smoothly.

◆Wind the mainspring. Don't mind if the unit begins to move while winding and keep on.



[How the Switch Works]



◆The switch comes to stop position when the reverse rotation stopper C catches the cam 1.

①Set the switch at the First Position whether the unit is moving or not. (Turn it down or up)

Important

The switch doesn't come to the stop position while moving. Do not turn the switch by force.

②At the First Position, the unit stops after a sequence of motions. Check that the cams move smoothly so far.

③After the motion, switch returns to the Start position.

④When the switch is set at the First Position, it starts moving again.

⑤When the switch is set at the Second Position, it keeps on moving until the mainspring stops.

Important

If you want to stop the shoot in succession, set the switch at the First Position. Then the switch returns to the Start position after a sequence of motions.

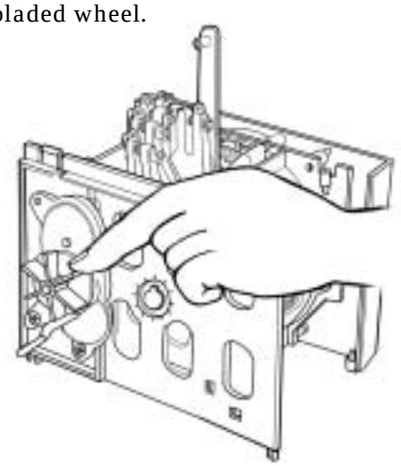
In case the cam plates rattle or stop on the way

If the cam plats doesn't move smoothly at this point, the doll won't move correctly. Be sure to check the motion. If it doesn't go well, take off the screws and take the unit to pieces and then assemble them again paying good attention to the following points.

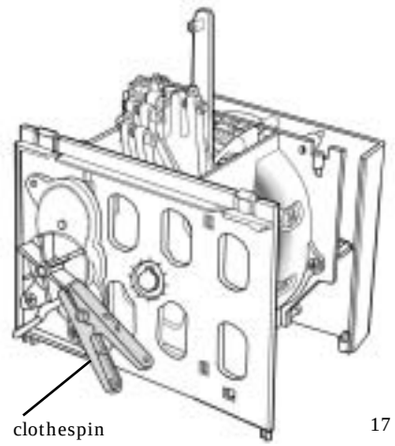
①Are the switch spring, reverse rotation stopper A, and reverse rotation stopper B set in right direction? (See 5, 6 and 7 at page 8)
②Check that the shaft , the rotary wheel A , large wheel, cam 1 are attached in this order and in the right directions. (See 8 at page 9.)
③Redo the Check at page 9 and make sure there are no problems.
④Are the cam 1 and the reverse rotation stopper C set correctly as 10 at page 9 shows?
⑤Check the order and the directions of the cam 1→ the cam plate 1→ the cam 2 → the cam plate2→ the cam 3 → the cam plate 3→ the cam 4 → the cam plate 4→ the cam 5 → the cam plate 5→ the cam 6 → the cam plate 6→ the cam 7 → the cam plate 7. (Do they follow the order shown in the page 12 ~13?)

[How to Stop the Motion Halfway]

It is possible to stop the motion anytime you like if you stop the bladed wheel.

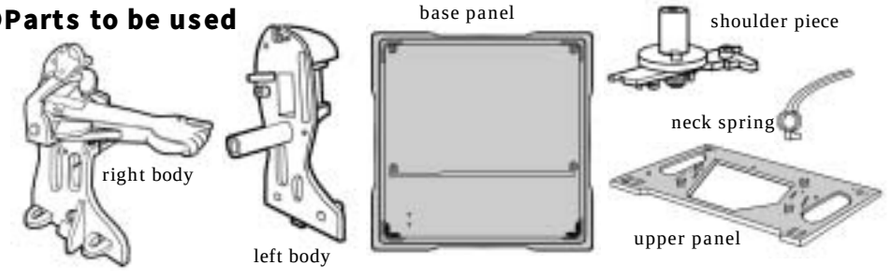


It is also possible to keep the condition if you pinch the bladed wheel with a clothespin.



Assembling the Body of the Bow-Shooting Boy

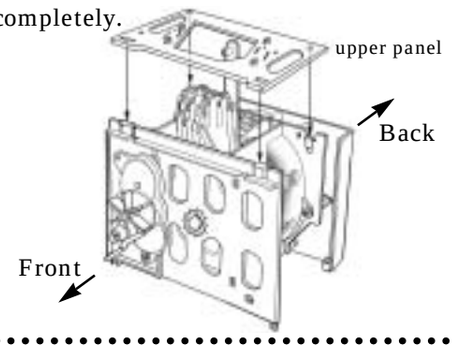
●Parts to be used



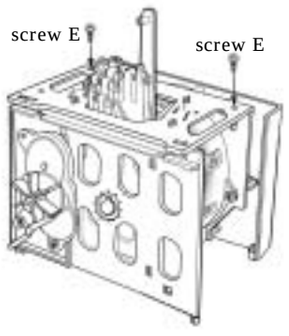
Screws to be used	A: One 2-by-6 mm with a collar	B: Four 2-by-10 mm with collars	C: One 2-by-8 mm	E: Six 3-by-8 mm

※Be careful to select correct screws since all the screws look similar.

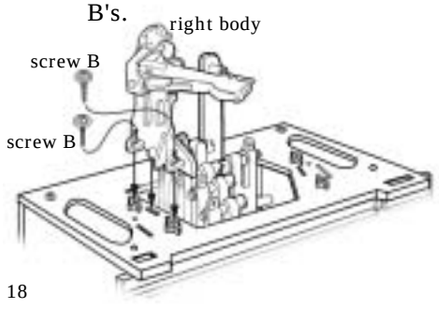
1 Put the upper panel on. Fit its projections at the back on the projections of the inside panel, and fit its holes at the front on the projections of the front panel completely.



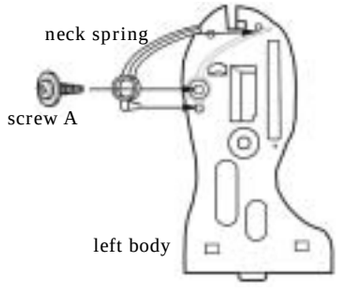
2 Fasten the upper panel to the inside panel with two screw E's.



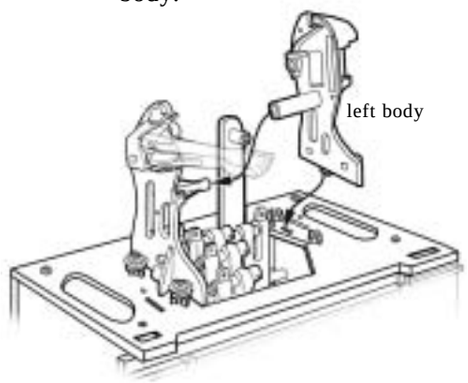
3 Fasten the right body to the upper panel with two screw B's.



4 Attach the neck spring to the left body with a screw A.

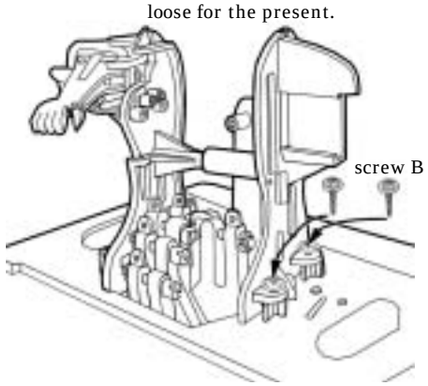


5 Attach the left body to the upper panel and the right body.



6 Fasten the left body with two screw B's. temporarily.

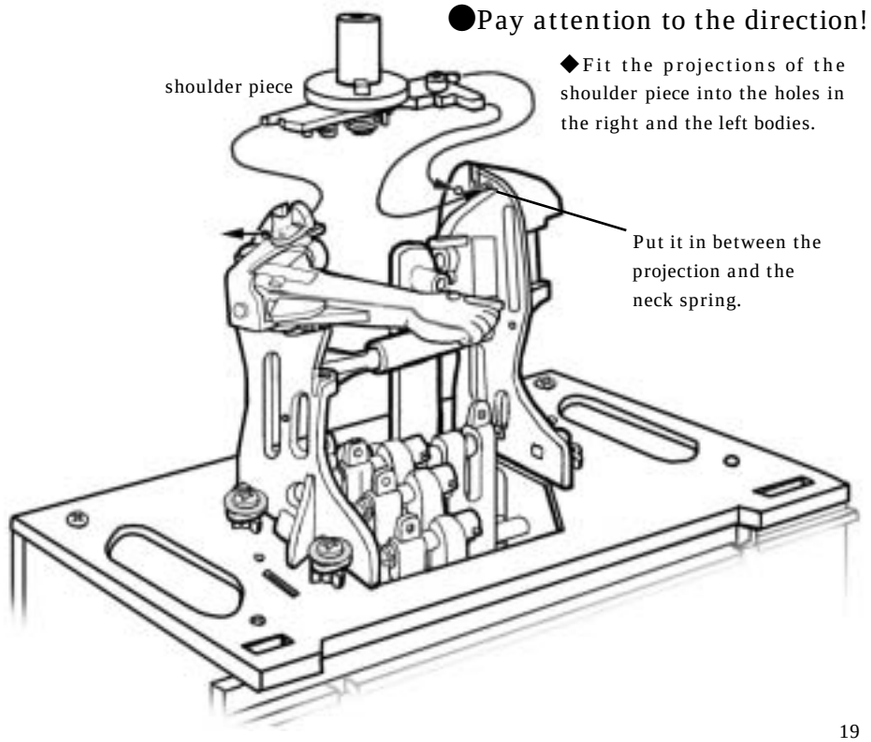
◆Leave the screws a little bit loose for the present.



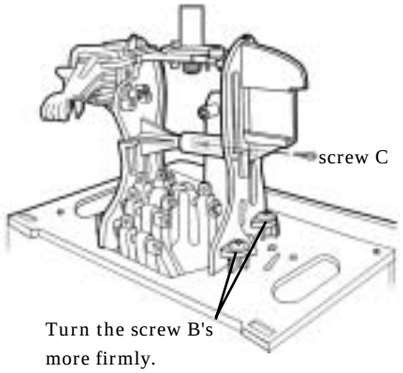
7 Set the shoulder piece between the right and the left bodies.

●Pay attention to the direction!

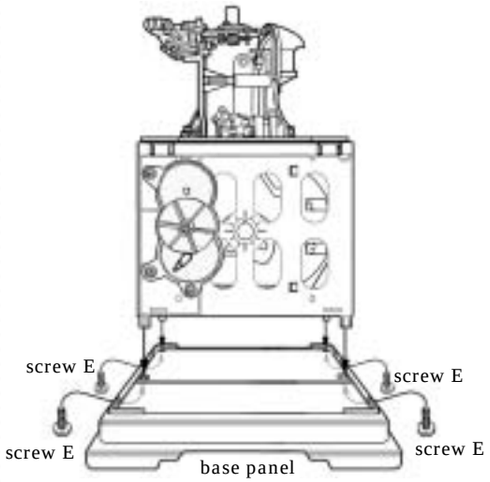
◆Fit the projections of the shoulder piece into the holes in the right and the left bodies.



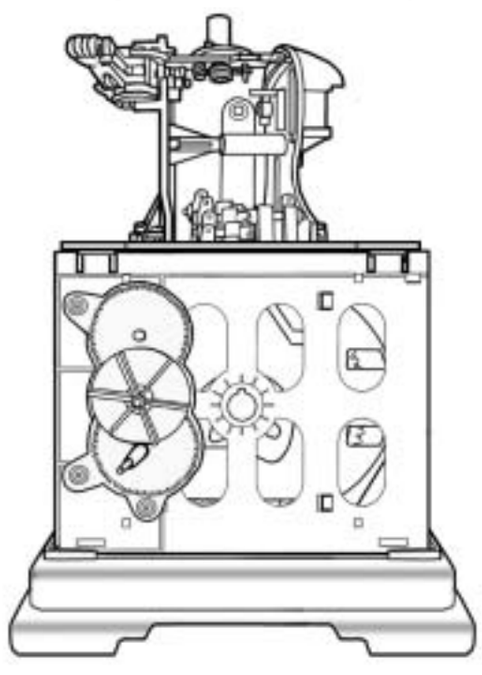
8 Fasten the left body to the right body with a screw C and then turn screw B's completely.



9 Put the unit onto the base panel and fasten it with screw E's from the bottom. (Fasten it with four screw E's from under the base panel.)



[The diagram of the assembly so far]



Stringing

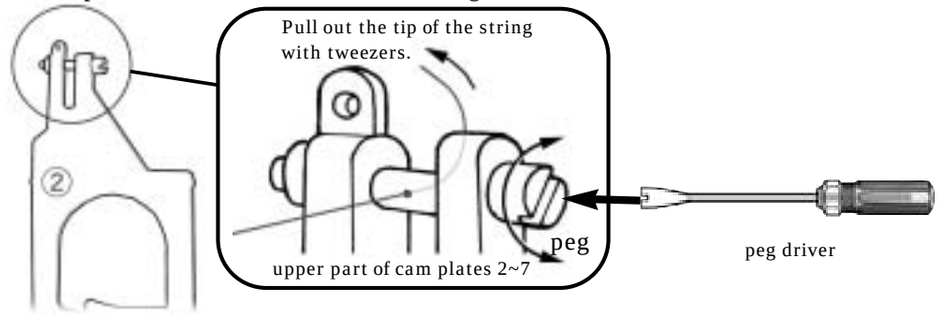
(Please read this page and understand the basics before start stringing.)

The motion of mainspring is transmitted to the cam plates through cams and then the motion is transmitted to the doll's hands, fingers and the head. Now, master the basics of stringing and then string the doll according to the process written from page 23.

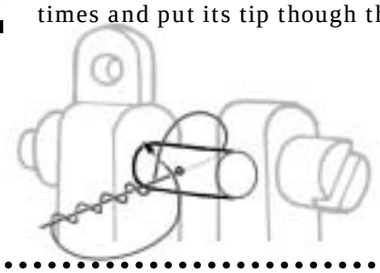
The Basics of Stringing

First, practice the basics of stringing. The diagram below is the enlarged upper part of cam plates 2~7.The process might differ with the cam plate to be used. Follow each instruction when stringing.

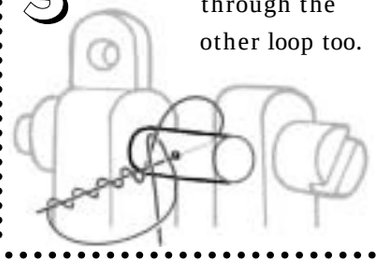
1 The black string (thick) is used for stringing. Put the pegdriver into the peg and turn the shaft so that the hole in the shaft comes to the good position and then thrust the string.



2 Put the string around itself four times and put its tip though the loop.

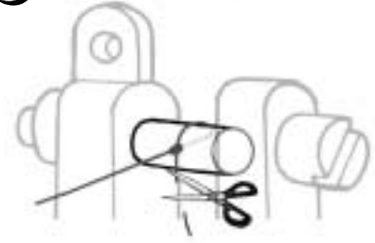


3 Put the tip through the other loop too.

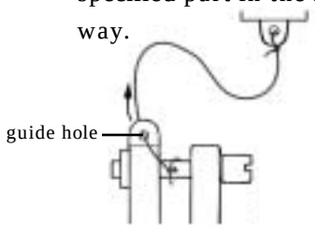


4 Pull the string and make a knot.

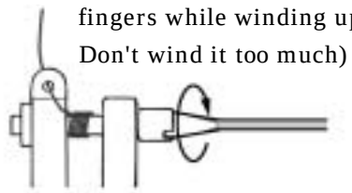
5 Tighten the loop and clip the tip of the string.



6 Put the string through the guide hole and tie it to the specified part in the same way.



7 Wind the loose string onto the shaft by turning the peg with the pegdriver. (Pull the string lightly with fingers while winding up. Don't wind it too much)



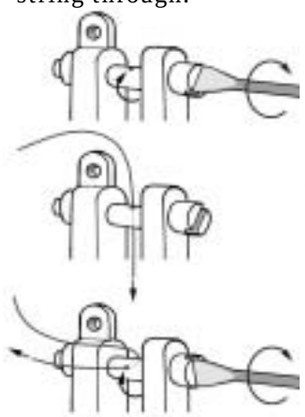
To Make the Work Easier

No. 1

Wind the mainspring and move cam plates until they come up to the good position and stop them there. (Pinch the bladed wheel with a clothespin)

No. 2

Sometimes it is effective to turn the hole in the shaft to the top first, and put the string through.

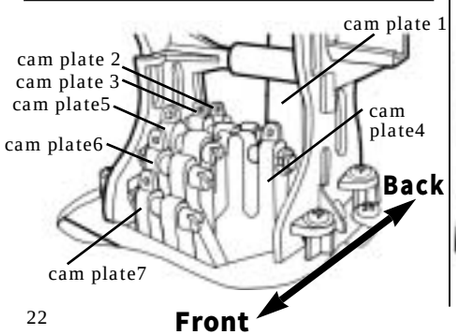


①Turn the hole in the shaft up with the peg driver.

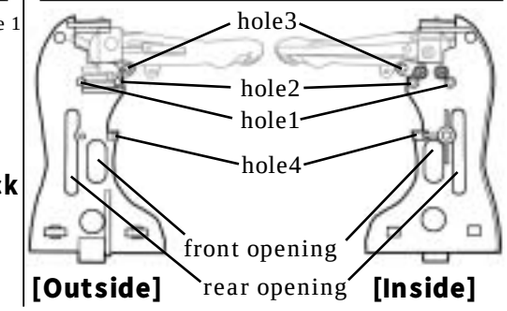
②Put the string through the hole long enough.

③Turn the shaft again and bring the hole to the front and pull the string out.

Check: The order of cam plates

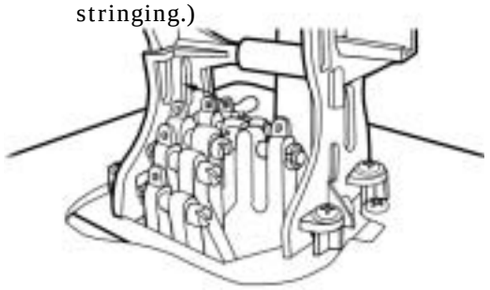


Check: The hole in the right body

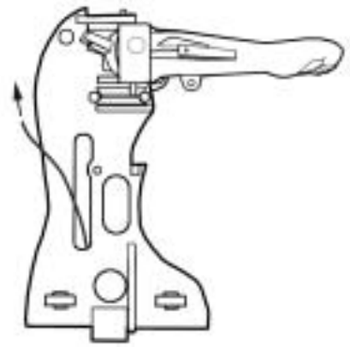


Tie the cam plate 2 and the right arm with a string

1 Cut the black string in about 30cm. Tie the string to the cam plate 2 and then put it through the guide hole from behind. (See the basics of stringing.)

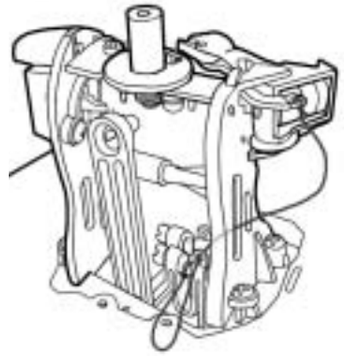


2 Pull it out of the rear opening in the right body.

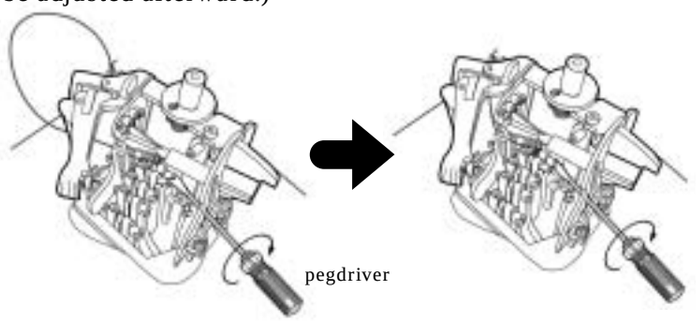


3 Tie it to the hole of the projection which is behind the right arm's elbow just like the knot at the shaft of the cam plate.

4 Cut the extra string short in 5~8 mm.

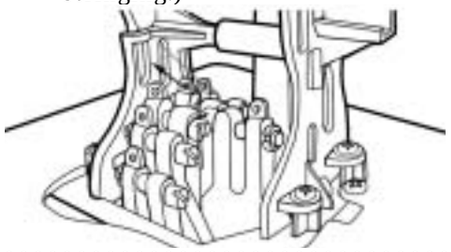


5 The string is long enough. Wind the loose string onto the shaft with the pegdriver so as not to be slack. (Don't roll it up too much since it is going to be adjusted afterward.)

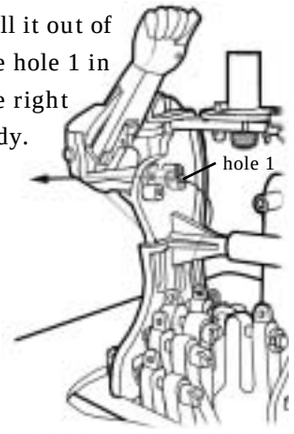


Tie the cam plate 3 and the right arm, and then the right arm and the cam plate 5 with the same string.

1 Cut the black string in about 40 cm. Tie the string to the cam plate 3 and then put it through the guide hole from behind. (See the basics of stringing.)

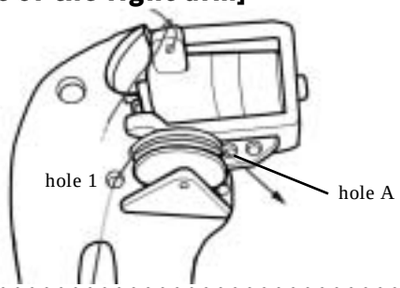


2 Pull it out of the hole 1 in the right body.

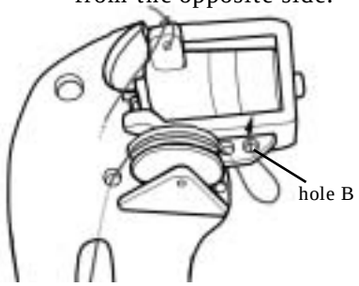


3 Guide the string along the groove and put it through the hole A.

[The enlarged out side view of the joint of the right arm]



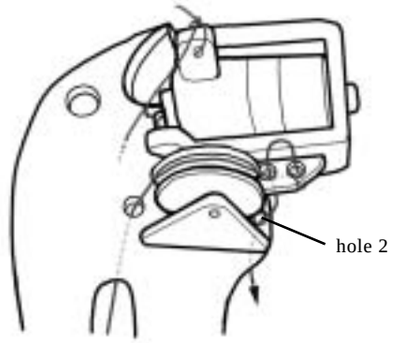
4 After putting through the hole A, put the string through the next hole B from the opposite side.



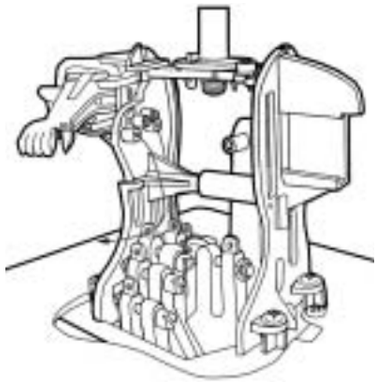
5 Send it under the hole and put it through the hole B one more time. (Put it around the frame of the hole B.)

6 Put it through the hole A again.

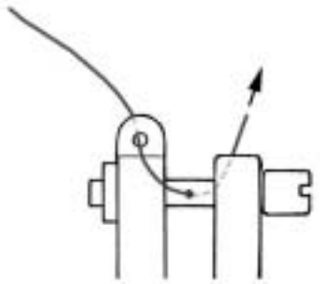
7 Put the string inside from the hole 2 in the right body.



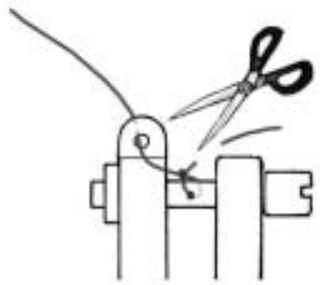
8 Put it through the guide hole in the cam plate 5 from behind.



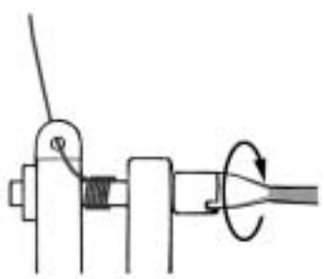
9 Put it through the hole in the shaft.

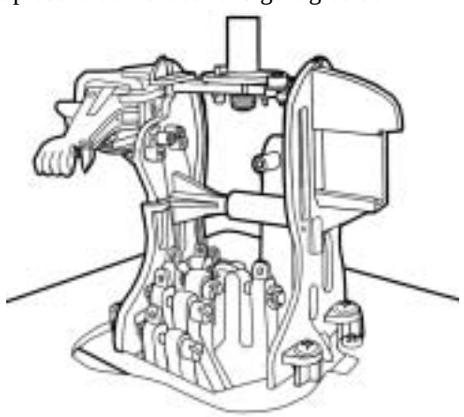


10 Tie it to the shaft and clip the tip.



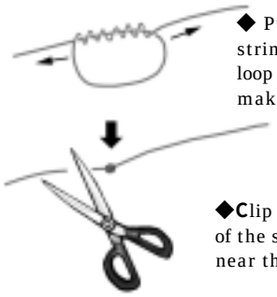
11 Wind the loose string onto the shaft with the attached pegdriver so as not to be slack. (Don't roll it up too much since it is going to be adjusted afterward.)





Tie the cam plate 6 and the right arm with a string

1 Cut the black string in about 30cm. Make a big knot at one end of the string.



◆ Put the tip of the string around the loop 4~5 times to make a big knot.

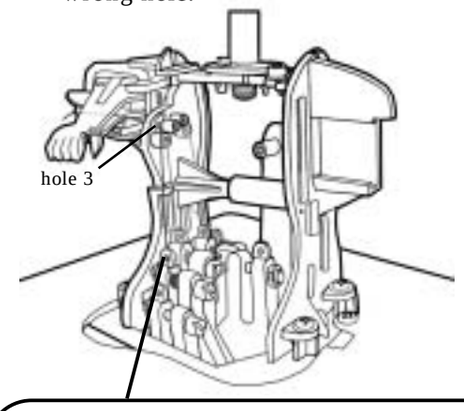
◆Clip the end of the string near the knot.

●Pay attention to the order of stringing since it is different from the basics.

2 Put the string through the hole from outside of the right arm.

◆ The knot has to be stuck in the hole. (If it goes through, make the knot larger.)

3 Put the string though the hole 3 after putting through the hole in the arm. Be careful not to put it thorough the wrong hole.



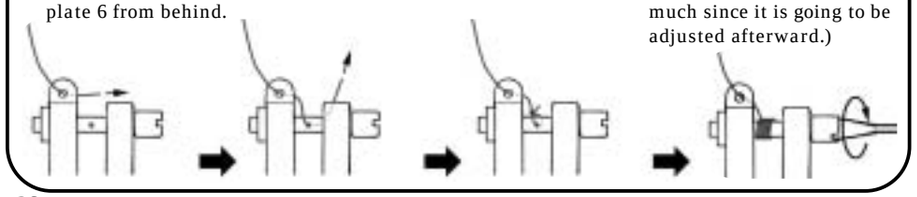
4 Make sure that the string stops at the knot.

①Put the string through the guide hole in the cam plate 6 from behind.

②Put it trough the hole in the shaft.

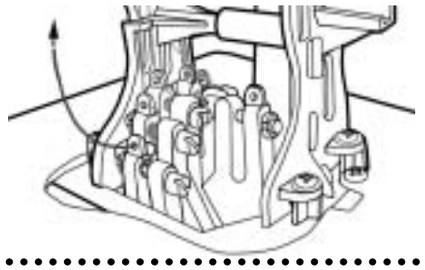
③Tie it to the shaft and clip the end off.

④Wind the loose string onto the shaft so as not to be slack. (Don't wind it too much since it is going to be adjusted afterward.)

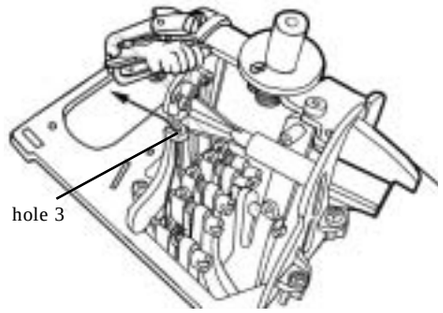


Tie the cam plate 2 and the right arm with a string

1 Cut the black string in about 30cm. Tie the string to the cam plate 7 and then put it through the guide hole from behind. (See the basics of stringing.)



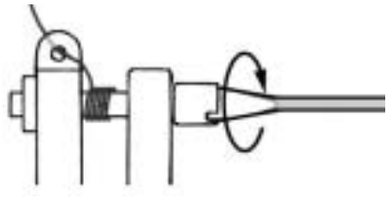
2 Pull the string through the hole 4 in the right body from under.

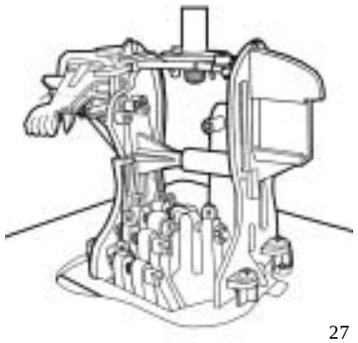


3 Tie the end of the string to the hole in the projection which is under the right arm just like the knot at the shaft of the cam plate.

4 Clip the tip of the string short in 5~8 mm.

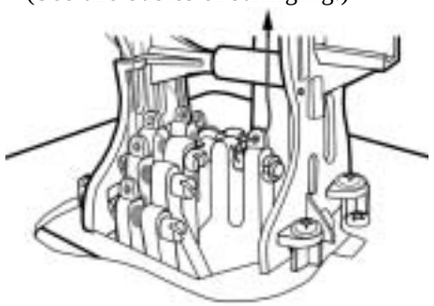
5 Wind the loose string onto the shaft with the attached pegdriver so as not to be slack. (Don't roll it up too much since it is going to be adjusted afterward.)





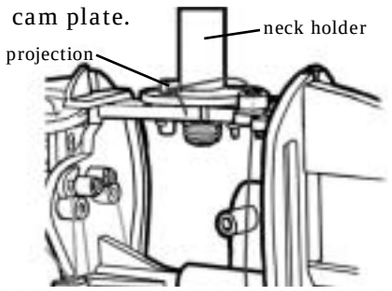
Tie the cam plate 4 and the neck holder with a string

1 Cut the black string in about 30cm. Tie the string to the cam plate 4 and then put it through the guide hole. (See the basics of stringing.)



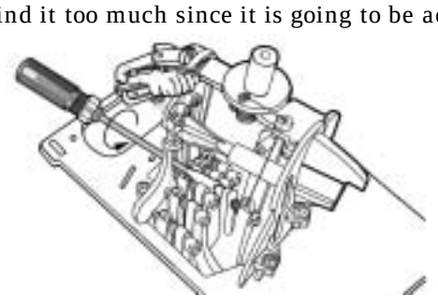
2 Pull it through the hole in the shoulder piece from under.

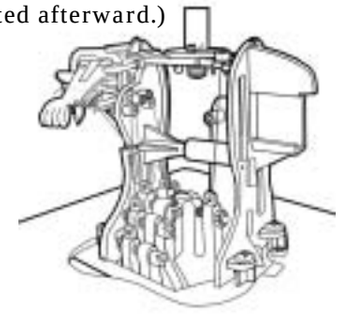
3 Tie the end of the string to the hole in the projection of the neck holder just like the knot at the shaft of the cam plate.



4 Clip the end of the string short in 5~8 mm.

5 Wind the loose string onto the shaft with the pegdriver so as not to be slack and until the projection of the neck holder comes to front. (Don't wind it too much since it is going to be adjusted afterward.)





Making Initial Adjustment of Strings

In order to make initial adjustment, you have to understand the function of each cam plate and the doll's sequence of motions. It will help you to adjust the doll smoothly.

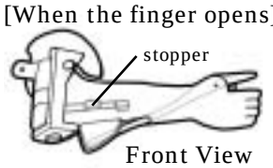
Preparation 1:Understanding the function of each cam plate

No. of the plate	Function	Explanation
cam plate 1	Operating the left arm	It bends and stretches the left arm holding the bow. The motion is not adjustable.
cam plate 2	Putting up and down the right arm	It puts up and down the right arm. When the string is strained, the right arm goes up.
cam plate 3	Rotating the right arm clockwise	When the string is strained, the right arm turns right (to the outside of the body: clockwise seen from above). The tip of the string is tied to the cam plate 5.
cam plate 4	Operating the head	It doesn't directly relate to the bow-shooting motion. It has a role to wag the head in accordance with the sequence of motions.
cam plate 5	Rotating the right arm counterclockwise	When the string is strained, the right arm turns left (to the inside of the body: counterclockwise seen from above). The tip of the string is tied to the cam plate 3.
cam plate 6	Opening and closing the thumb	When the string is strained, the thumb closes to grasp the arrow with the right hand. Once it closes, the stopper works and no more power works on the thumb.
cam plate 7	Trigger	When the string is strained, the stopper becomes off and the thumb snaps open and let go of the arrow. It works as a trigger.

The structure of the right arm

When the thumb closes, the stopper works and it is locked in that state.

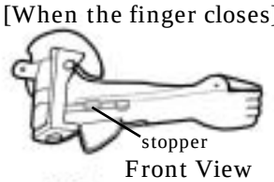
[When the finger opens]



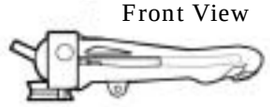
Front View

Side View

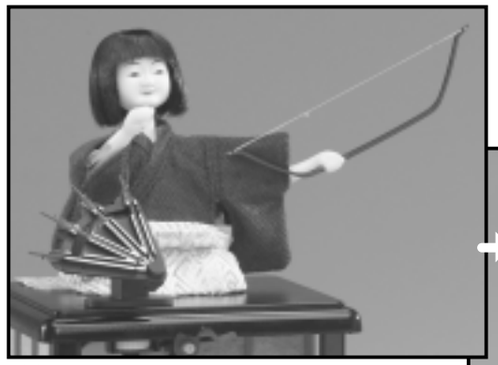
[When the finger closes]



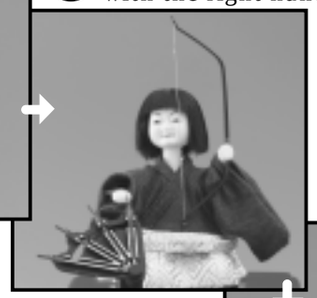
Front View



Side View



❷ The doll grasps an arrow with the right hand.



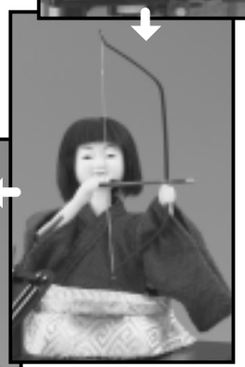
It brings the arrow to the bow. ❸

❶ The starting position. The right arm reaches for the arrow holder.

Preparation 2:Understanding the sequence of motions from the start to the arrow shoot

If you understand the sequence of motions of the doll, it will help you to adjust the doll. Check each motion from the start to the shoot paying attention to the motion of the right arm.

❽ It reaches for the next arrow.



❹ It fits the arrow to the bow.

❺ It turns the head a little and looks at the target.

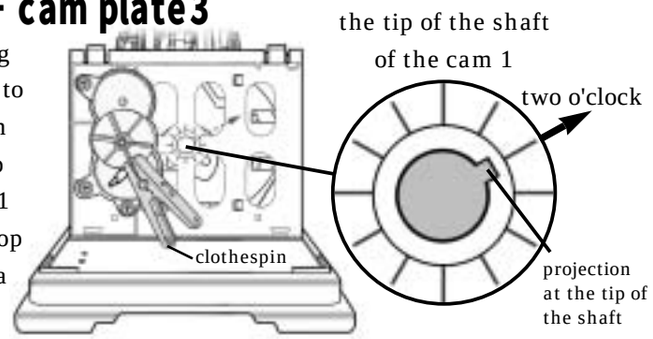
❻ It stretches the left hand, draws the bow, brings the face close to the arrow and aims at the target.

❼ It shoots the arrow.

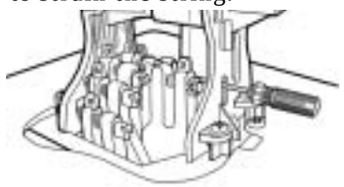
Wind the mainspring to move the machine and adjust the length of strings so that each part moves correctly. Stop the bladed wheel to make the adjustment when the projection at the tip of the shaft of the cam 1 that is at the center of the front panel comes to the right place.
(A Clothespin is needed to stop the bladed wheel.)

1. Adjusting how far the right arm turns clockwise ···Two o'clock + cam plate3

① Wind the mainspring and turn the switch on to start cam plates. When the projection at the tip of the shaft of the cam 1 comes to two o'clock, stop the bladed wheel with a clothespin.

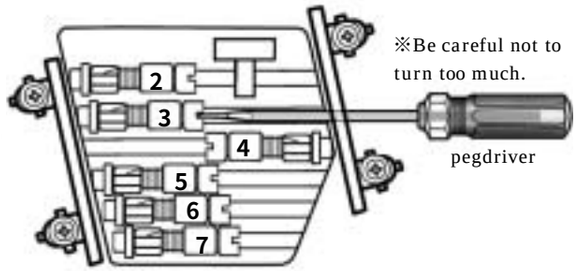


② Turn the peg of the cam plate 3 with the pegdriver to strain the string.



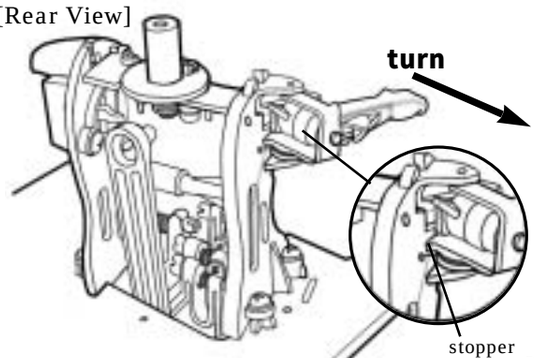
※ Caution: Cam plate 1 has no pegs. Cam plate 2~7 have pegs.

[Top View]



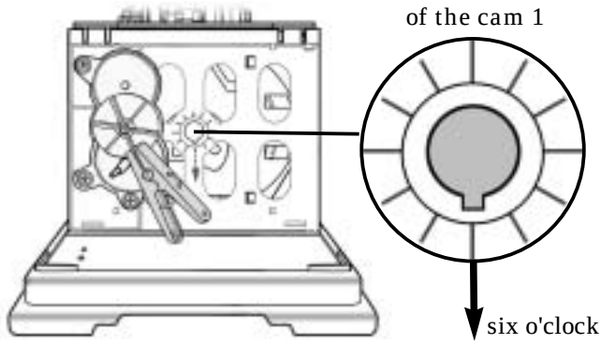
③ When the string is strained, the right arm turns clockwise seen from above. Pull the string until the stopper at the arm joint touches the right body. (Be careful not to strain it too much.)

[Rear View]

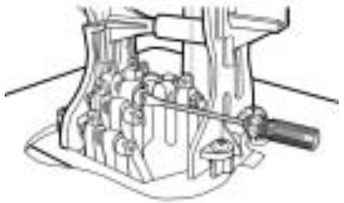


2.Adjusting how far the right arm turns counterclockwise ···Six o'clock + cam plate 5

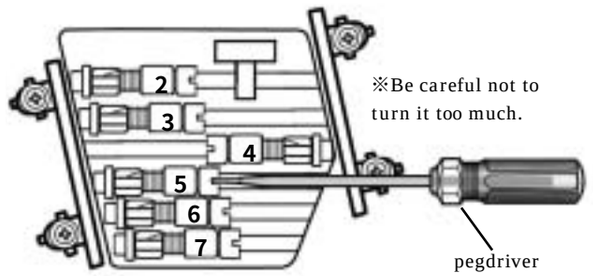
① Start cam plates from the position of 1 (two o'clock). When the projection at the shaft of the cam 1 comes to six o'clock, stop the bladed wheel with a clothespin.



② Turn the peg of the cam plate 5 with the pegdriver to strain the string.

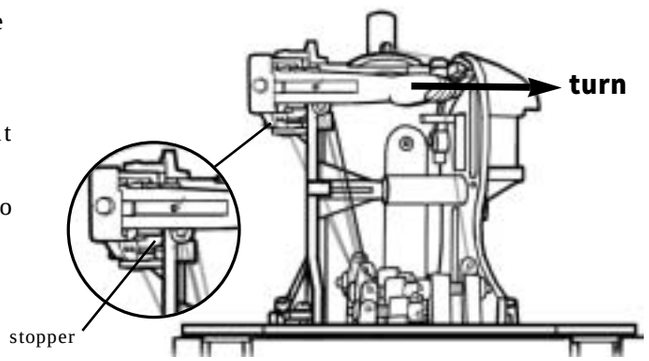


[Top View]



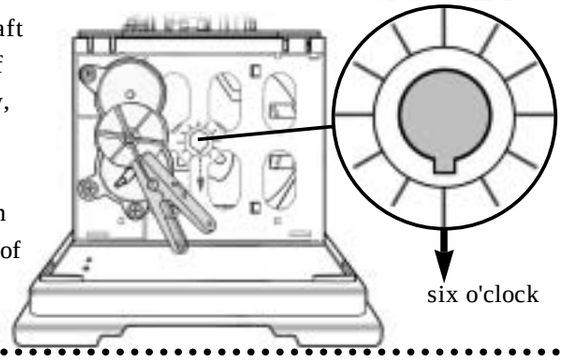
③ When the string is strained, the right arm turns counterclockwise seen from above. Pull the string until the stopper at the arm joint touches to the right body. (Be careful not to strain it too much.)

[Front View]

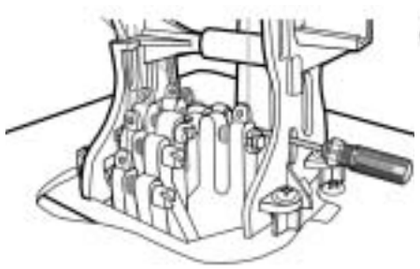


3.Adjusting how high the right arm goes up ···Six o'clock + cam plate 2

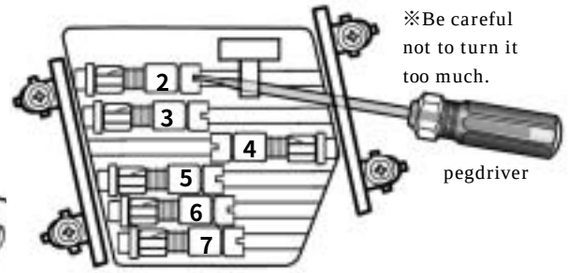
① Set the projection of the shaft of the cam 1 in the direction of six o'clock. (If it's set already, continue adjusting. If it's not, start cam plates and stop the bladed wheel with a clothespin when the projection at the tip of the shaft of the cam 1 is at six o'clock.)



② Turn the peg of the cam plate 2 with the pegdriver to strain the string.

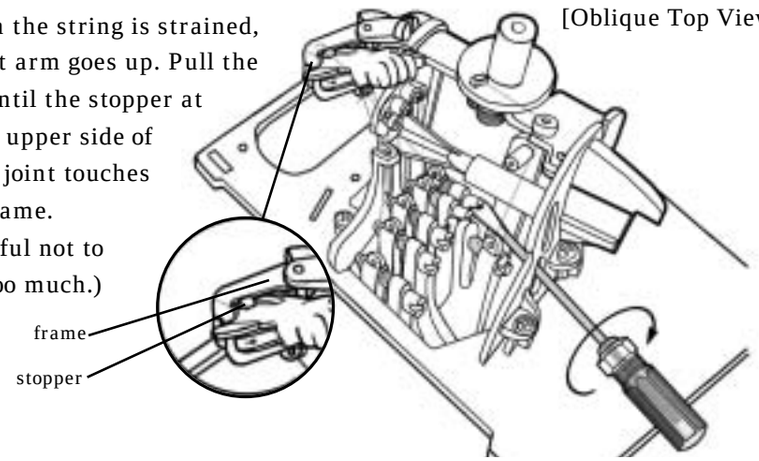


[Top View]



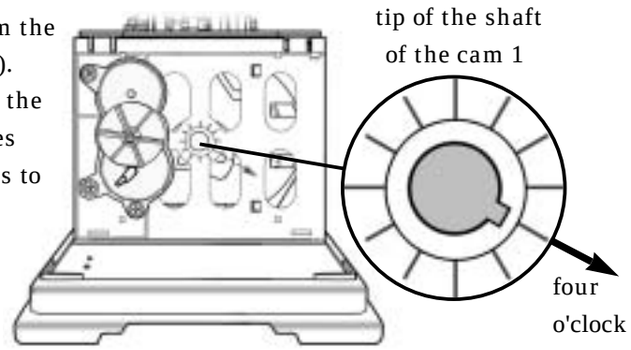
③ When the string is strained, the right arm goes up. Pull the string until the stopper at the rear upper side of the arm joint touches to the frame.
(Be careful not to strain too much.)

[Oblique Top View]



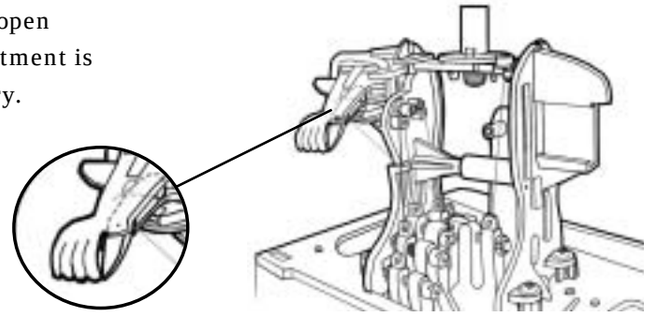
4. Adjusting how the thumb closes …Four o'clock + cam plate 6

① Start cam plates from the position of 3 (six o'clock). When the projection at the shaft of the cam 1 passes twelve o'clock and comes to four, check the motion without stopping the bladed wheel.

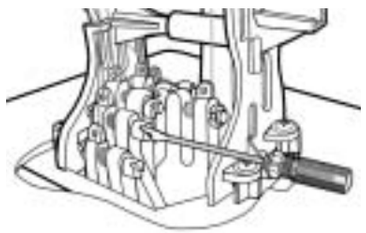


② If the thumb closes and doesn't open again, adjustment is not necessary.

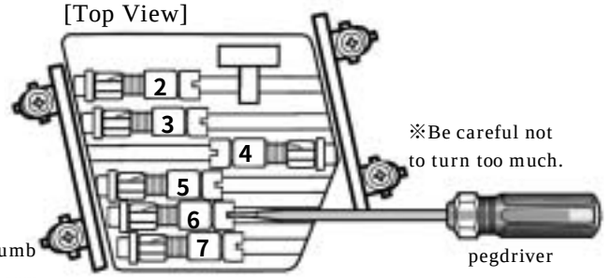
[Front View]

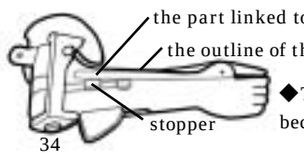


③ If it doesn't close, or if it closes but open too soon, stop the machine at four o'clock and hold the arm with fingers so as not to wag, and turn the peg of the cam plate 6 to strain the string until the thumb closes.



[Top View]

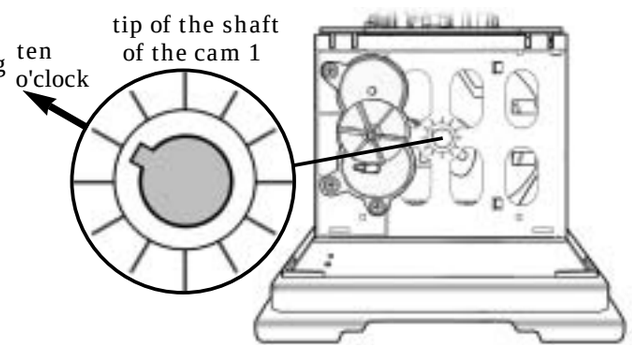




◆Turn it until the part linked to the thumb becomes parallel with the outline of the right arm.

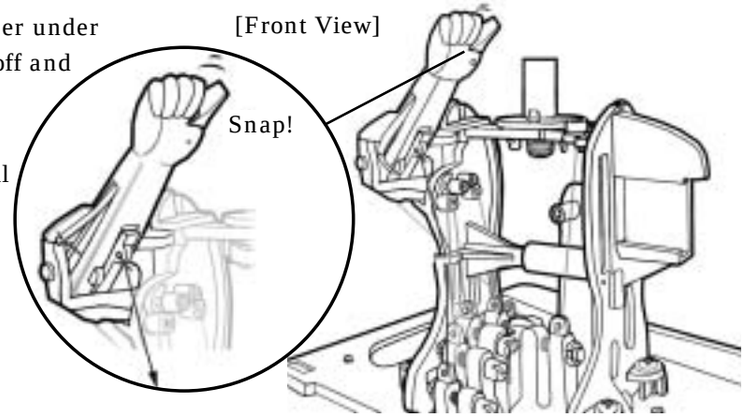
5. Adjusting the trigger …Ten o'clock + cam plate 7

① Start cam plates from four o'clock (after making a round). When the projection of the shaft of the cam 1 comes to ten o'clock, check the motion without stopping the bladed wheel.

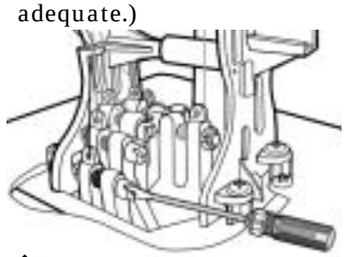


② If the stopper under the arm goes off and thumb snaps open, the operation is all right.

[Front View]

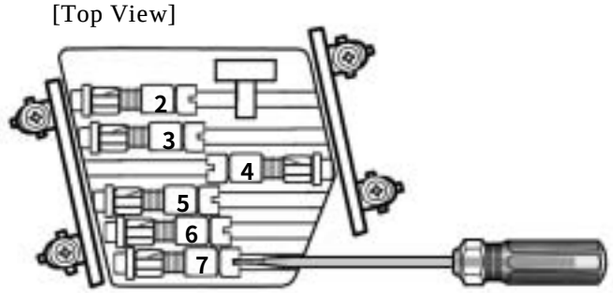


③ If it doesn't open, stop the motion at ten o'clock and turn the peg of the cam plate 7 to strain the string until the stopper goes off and the thumb opens. (Be careful not to strain too much. when it snaps open, the adjustment is adequate.)



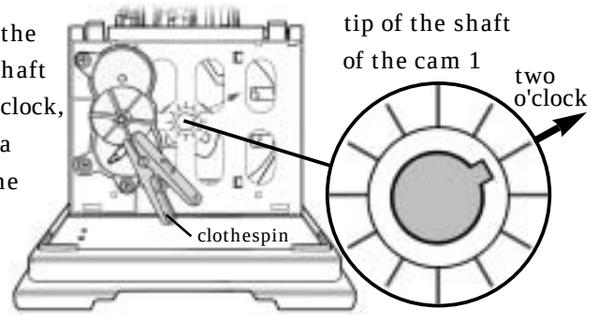
◆Be careful not to move the cam plate up and down.

[Top View]



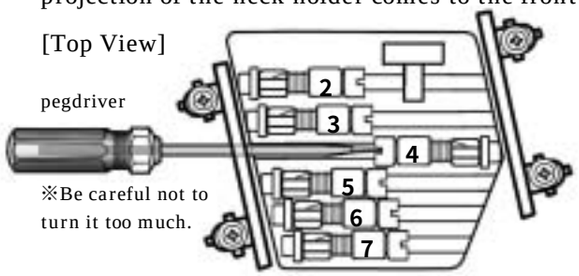
6. Adjusting the motion of the head ··· Two o'clock + cam plate 4

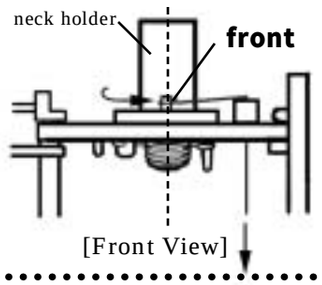
① Start cam plates. When the projection at the tip of the shaft of the cam 1 comes to two o'clock, stop the bladed wheel with a clothespin. (So far, this is the same operation with the adjustment of how far the right arm turns clockwise.)



Turn the peg of the cam plate 4 with the pegdriver. Strain the string so that the neck part at the upper shoulder piece turns little by little until the projection of the neck holder comes to the front of the body.

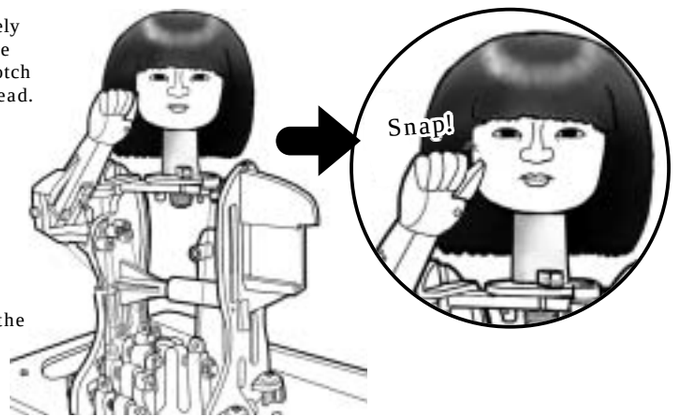
[Top View]





③ Set the head on the neck holder completely and start cam plates. The head turns towards the left arm in accordance with the motion of the arm. Then the head bends forward and stops just before it touches the thumb and then the thumb snaps open. The finger must not touch the face. If it does, loosen the peg for adjustment so that it stops just before the face (about 1mm apart).

◆ Set the head completely until the projection at the neck holder fits in the notch at the neck part of the head.



7. Making the final check while watching the motion

Check the motion of each part while watching the sequence of motions. Wind the mainspring and turn the switch down to the position 1 to start. If the motions are not smooth, make an adjustment once again from "Adjusting how far the right arm turns clockwise" written in page 31. Adjust motions by changing the tension of the strings. (Take off the head after the final check.)

starting position
The right arm is pointing up and aslant. The thumb is open.

the shaft of cam 1 ···twelve o'clock

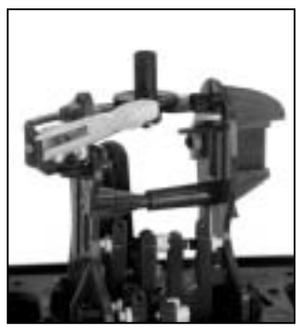
1. Keeping the thumb open, the doll moves around the arm to the front and lowers it to the horizontal level.

the shaft of cam 1 ···two o'clock

2. It closes the thumb while it keeps the arm where it is. The stopper works to keep the thumb close.

the shaft of cam 1 ···four o'clock

3. While raising the arm, it moves around the arm and draws it close to the chest.



the shaft of cam 1 ···four~six o'clock

4. It pauses for a moment keeping the arm drawn to the chest up and aslant.

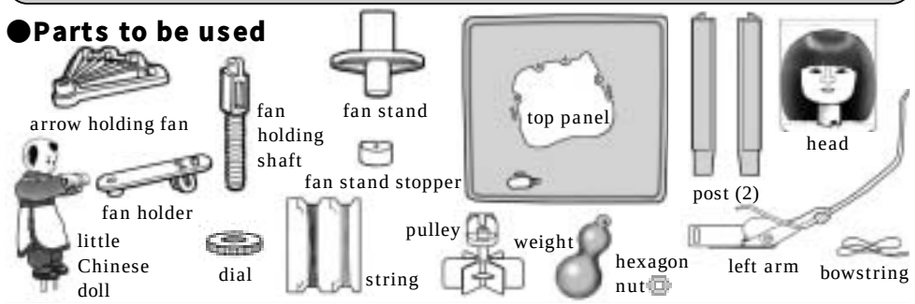
the shaft of cam 1 ···six~eight o'clock

5. When the shaft of the cam 1 is at 10 o'clock, the stopper snaps off and the thumb opens.

the shaft of cam 1 ···ten o'clock

Assembling the Arrow Holder and Installing It

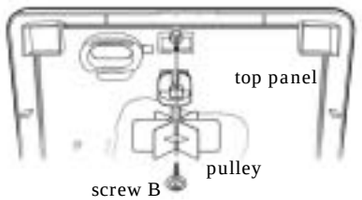
●Parts to be used



Screws to be used	A: Two 2-by- 6 mm with collars	B: One 2-by-10 mm with collar	D: One 2-by-12 mm	E: Two 3-by-8 mm	F: One 3-by-10 mm

※Be careful since all the screws look similar.

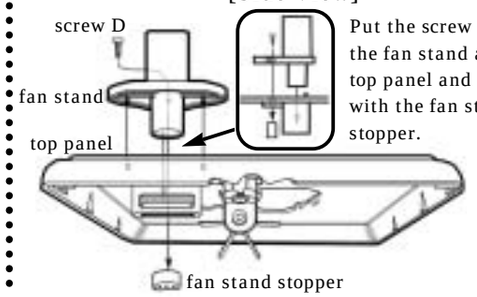
1 Attach the pulley under the top panel with a screw B.



◆ Put in the flat part and screw the pulley.

2 Attach the fan stand temporarily to the top panel with a screw D and the fan stand stopper.

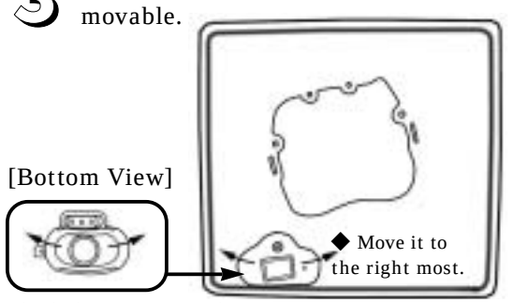
[Side View]



Put the screw through the fan stand and the top panel and fasten it with the fan stand stopper.

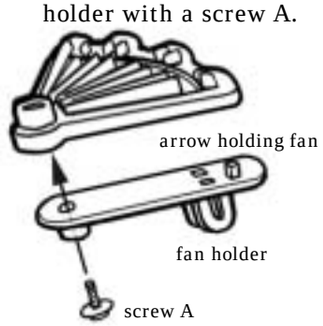
3 Screw the fan stand steady but movable.

[Bottom View]

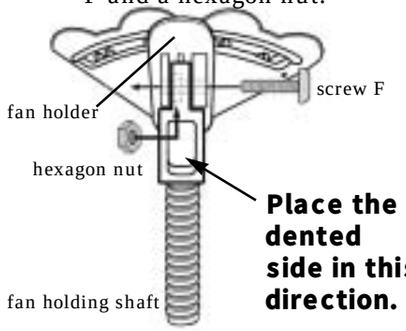


Check that it moves right and left within the frame.

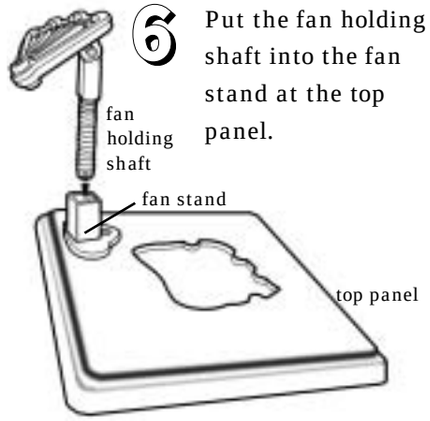
4 Attach the arrow holding fan to the fan holder with a screw A.



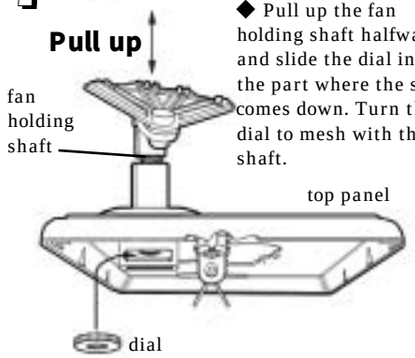
5 Attach the fan holder to the fan holding shaft with a screw F and a hexagon nut.



6 Put the fan holding shaft into the fan stand at the top panel.



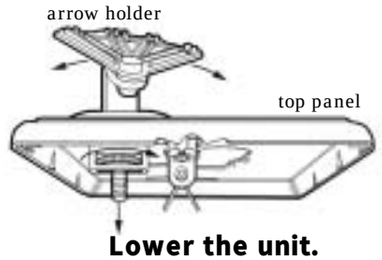
7 Attach the dial to the fan holding shaft.



◆ Pull up the fan holding shaft halfway and slide the dial into the part where the shaft comes down. Turn the dial to mesh with the shaft.

8 Turn the dial to lower the arrow holder.

◆ Check that the arrow holder moves left and right smoothly. If it doesn't, loosen the screw F a little.

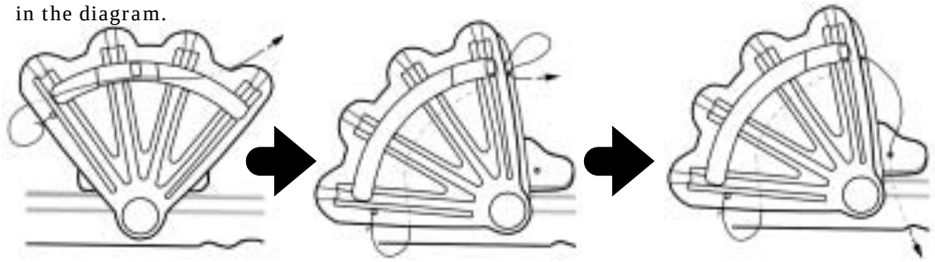


9 Attach a transparent string (thin) to the fan. The length is about 30cm. Tie the string and clip the end just like the way of stringing.

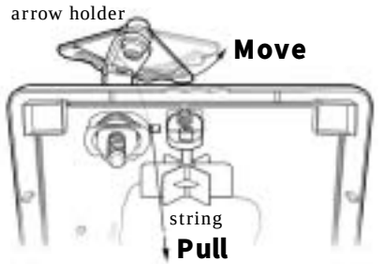
① Tie the string to the hole at the left side of the fan and put it through as shown in the diagram.

② Put it through the hole in the fan holder.

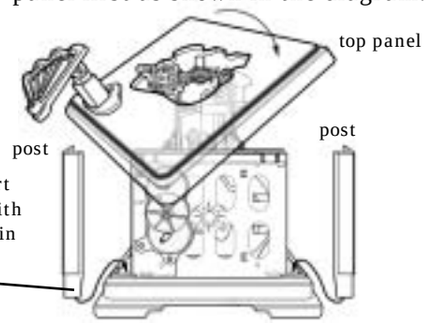
③ Put it through the hole in the fan stand and send it under the top panel.



10 Pull the string under the top panel to the place shown in the diagram below. Check that the arrow holder moves when you pull the string.

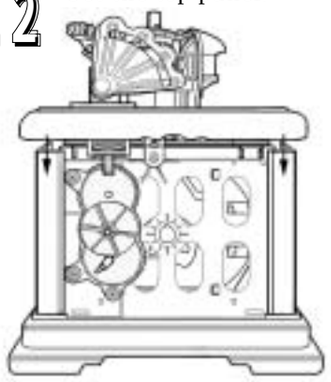


11 Insert posts into the base panel and then set the top panel. Hold the top panel aslant, and put the right elbow through the hole in the top panel first as shown in the diagram.

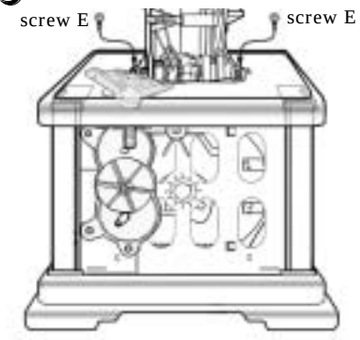


◆ Insert posts with their thin ends down.

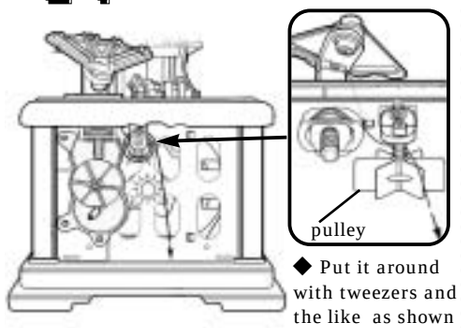
12 Set the top panel.



13 Fasten the top panel to the upper panel with two screw E's.

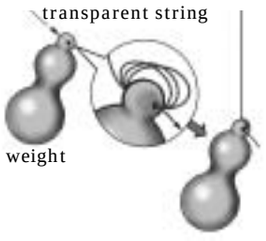


14 Put the string around the shaft of the pulley twice.



◆ Put it around with tweezers and the like as shown in the diagram.

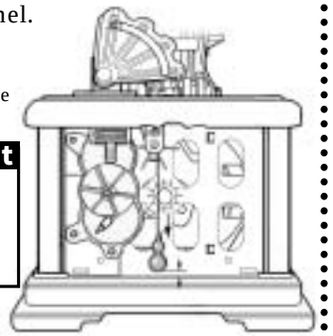
15 Put the string through the hole in the top of a weight. Repeat it three times to make three loops and fasten the weight temporarily.



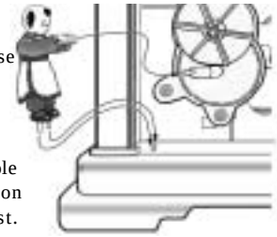
16 Strain the string and then tie the weight at the point where it almost touches the base panel.

◆ See p.21for how to tie the string. Clip the extra string.

Important
Move the arrow holder to the lowest position.

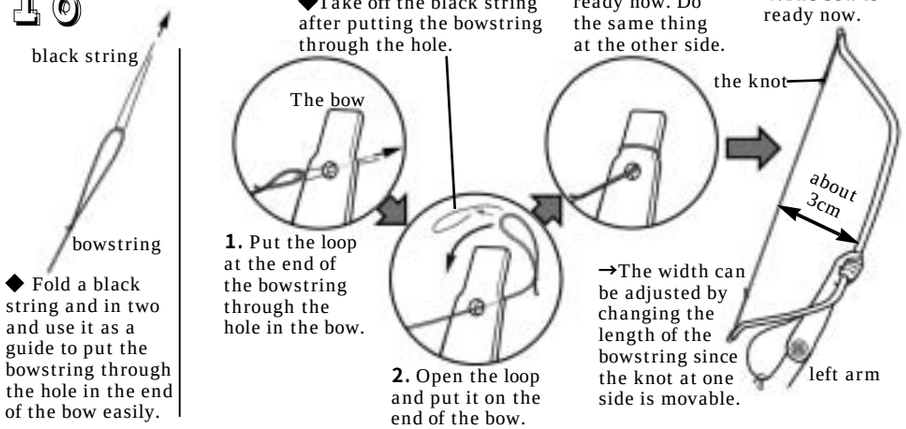


17 Attach the little Chinese doll. Insert the shaft of the combination wheel into the hole in its hands and insert the projections at its feet into the hole in the base panel.



◆Put the hole at its hands on the shaft first.

18 String the bow in the left hand.



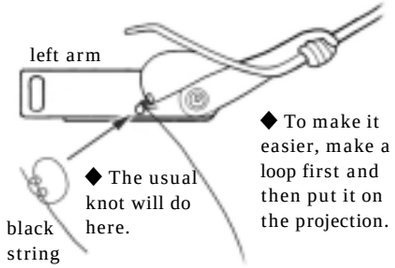
◆ Fold a black string and in two and use it as a guide to put the bowstring through the hole in the end of the bow easily.

1. Put the loop at the end of the bowstring through the hole in the bow.

2. Open the loop and put it on the end of the bow.

→The width can be adjusted by changing the length of the bowstring since the knot at one side is movable.

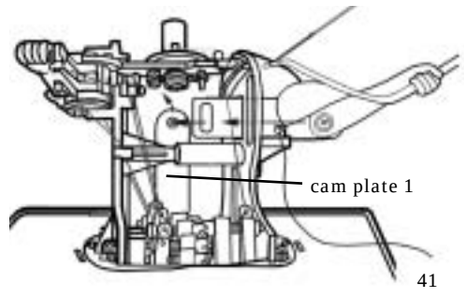
19 Cut a black string in about 30cm and tie it to the projection under the left arm.



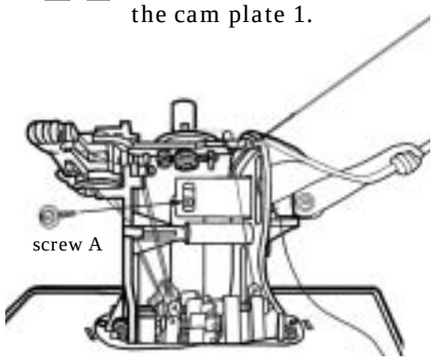
◆ The usual knot will do here.

◆ To make it easier, make a loop first and then put it on the projection.

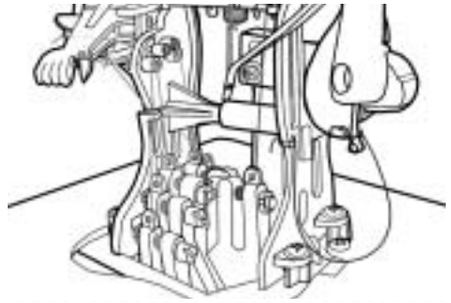
20 Insert the left arm into the left body and put the hole on the projection at the cam plate 1.



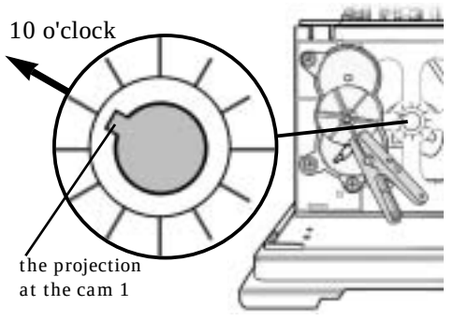
21 Attach a screw A to the hole in the projection at the cam plate 1.



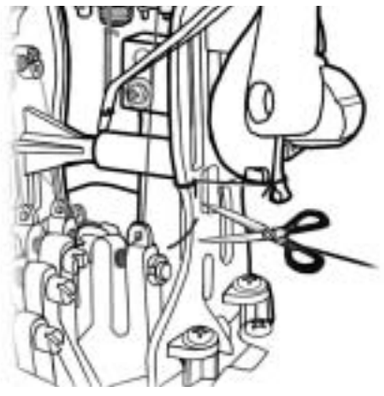
22 Put the black string at the projection under the left arm through the hole in the left body twice as shown in the diagram.



23 Start cam plates and stop it when the projection at the shaft of the cam 1 is at 10 o'clock. Fasten the bladed wheel with a clothespin.



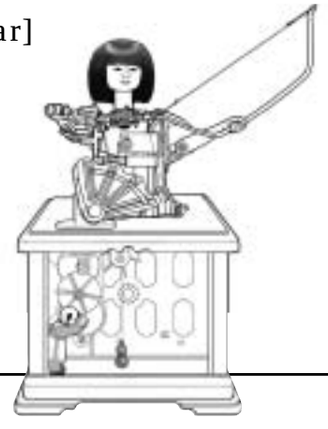
24 Stand the bow and strain the black string and tie. Clip the extra string.



[The diagram of the assembly so far]

Set the head again. (Insert it into the neck holder at the shoulder piece completely.)

Notice: Put the cover on the head when not using to prevent the hair from spreading.



Adjusting the Position of the Arrow Holder and the Right Arm

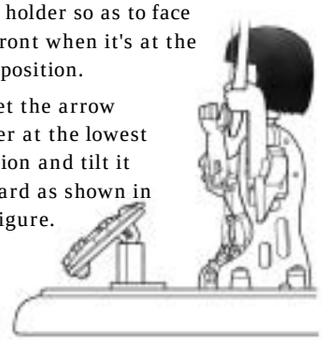
Preparation

Let's adjust the position before you wind the mainspring and start the doll.

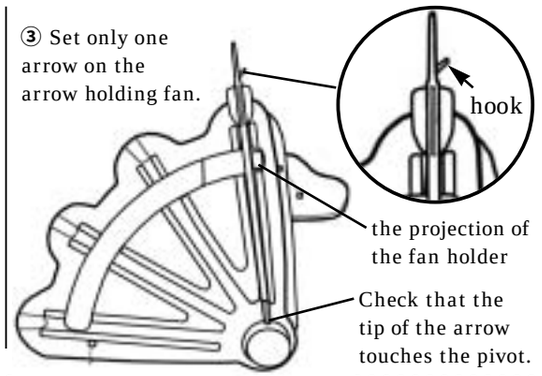
Notice: The hook must be in this direction.

① Set the head on the neck holder so as to face the front when it's at the stop position.

② Set the arrow holder at the lowest position and tilt it forward as shown in the figure.

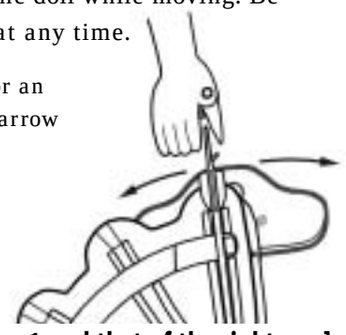


③ Set only one arrow on the arrow holding fan.



Operation

Wind the mainspring and turn the switch down to the first position and adjust the doll while moving. Be ready to stop the motion at any time.

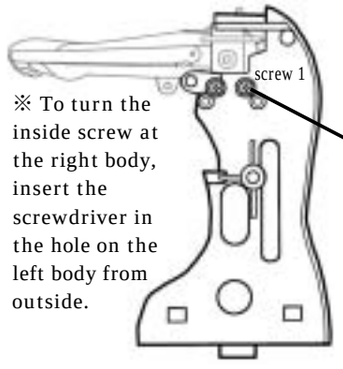


① Stop the doll when it reaches out the right hand for an arrow. Adjust the fan stand and fasten it so that the arrow goes between the thumb and the forefinger.

● If the arrow doesn't go between the fingers after adjusting the fan stand …

Turn the screw 1 to adjust the position of the right arm as shown in the diagram below.

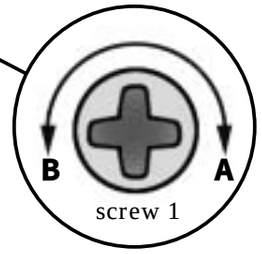
[The relationship between the direction of the screw 1 and that of the right arm]

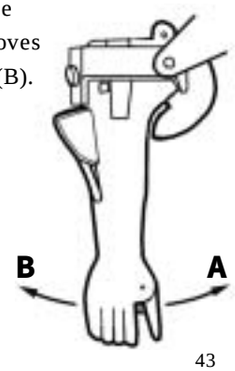


※ To turn the inside screw at the right body, insert the screwdriver in the hole on the left body from outside.

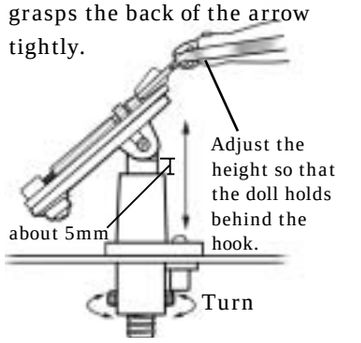
[right body (inside)]

When you turn the screw 1 in the direction A (B), the right arm moves little by little in the direction A (B).

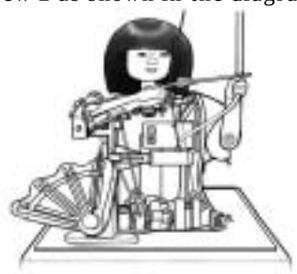




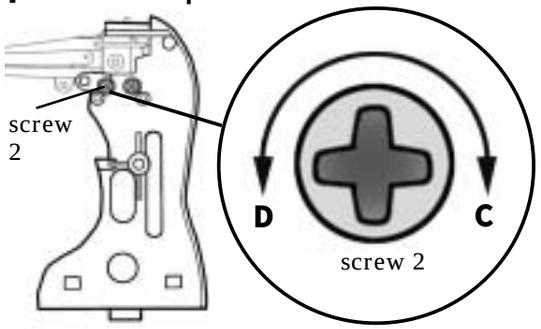
② Adjust the height of the arrow holder so that the right hand grasps the back of the arrow tightly.



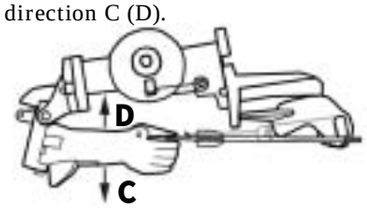
③ Move the doll again. Check that the hook of the arrow catches the bowstring when the doll fits the arrow on. If it doesn't or if the arrow comes too close to the body, adjust the arm with screw 2 as shown in the diagram.



[The relationship between the direction of the screw 2 and that of the right arm]

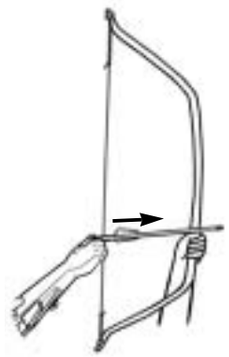


When you turn the screw 2 in the direction C (D), the right arm moves little by little in the direction C (D).



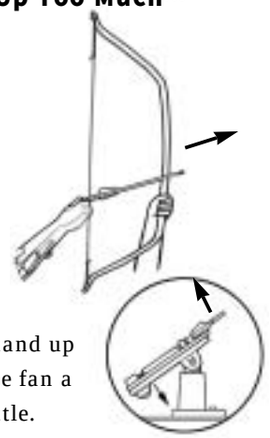
③ Move the doll again. Adjust the angle of the arrow when it is fitted on. If the point of the arrow is on the left hand, the adjustment is adequate.

●The Best Position



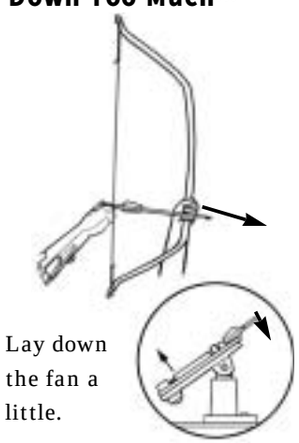
The tip of the arrow is on the left fist.

●If the Arrow Goes Up Too Much…



Stand up the fan a little.

●If the Arrow Goes Down Too Much…



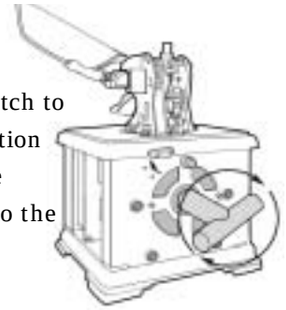
Lay down the fan a little.

Testing the Bow-Shooting Motion

Be sure to wind the mainspring fully every time you make the doll shoot the bow.

Preparation

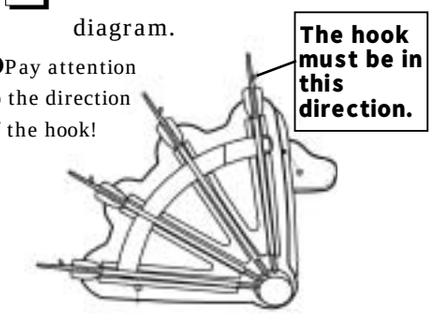
1 Turn the switch to the stop position and wind the mainspring to the full extent.



2 Set all four arrows on the arrow holder as shown in the diagram.

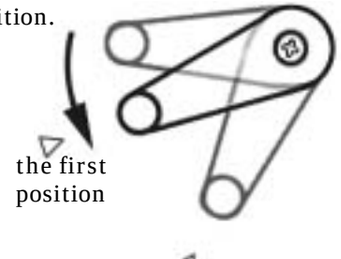
●Pay attention to the direction of the hook!

The hook must be in this direction.



The Single Shoot

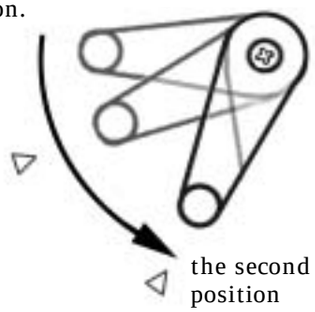
Turn the switch down to the first position.



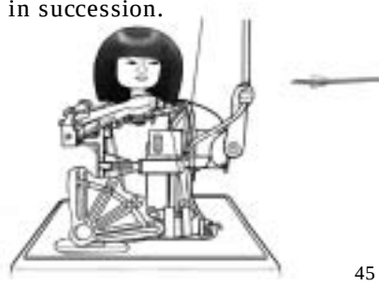
It stops after a single shoot.

Four Shoots in Succession

Turn the switch down to the second position.

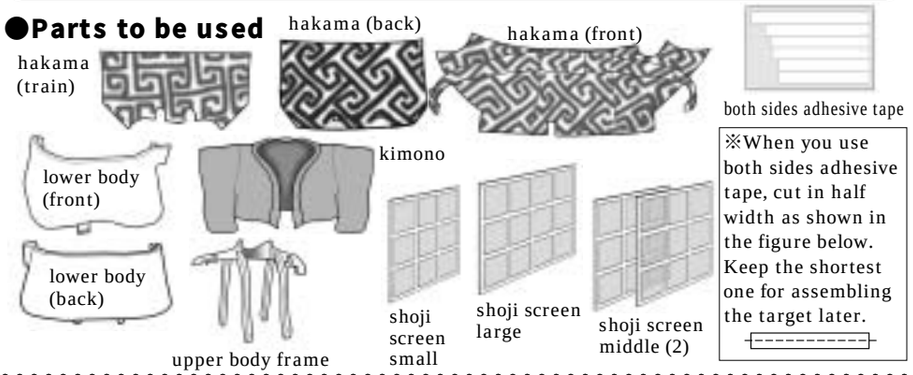


It keeps moving until the mainspring loosens completely. After it takes an arrow, the arrow holding fan moves so that the next arrow is taken to be shot in succession.



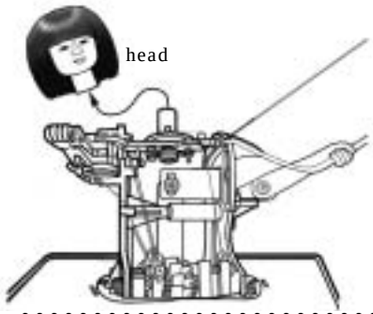
Dressing the Doll in the Kimono and the Hakama and Setting the Shoji Screen

●Parts to be used

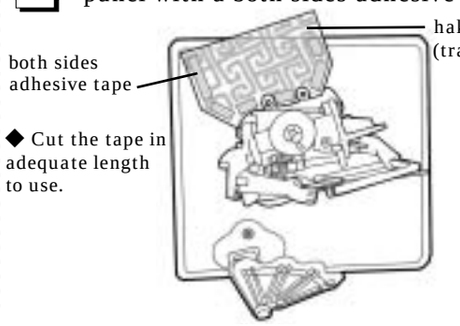


※When you use both sides adhesive tape, cut in half width as shown in the figure below. Keep the shortest one for assembling the target later.

1 Remove the head before dressing the kimono.

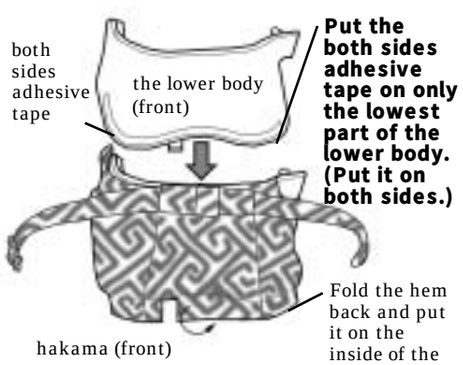


2 Put the hakama (train) on the top panel with a both sides adhesive tape.



◆ Cut the tape in adequate length to use.

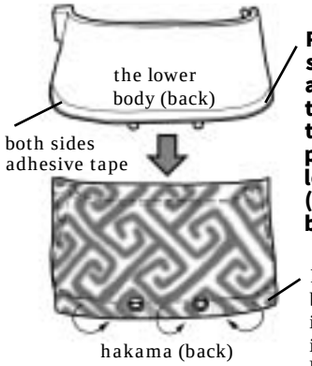
3 Put the hakama (front) on the lower body (front) with a both sides adhesive tape.



Put the both sides adhesive tape on only the lowest part of the lower body. (Put it on both sides.)

Fold the hem back and put it on the inside of the lower body (front).

4 Put the hakama (back) on the lower body (back) with a both sides adhesive tape.



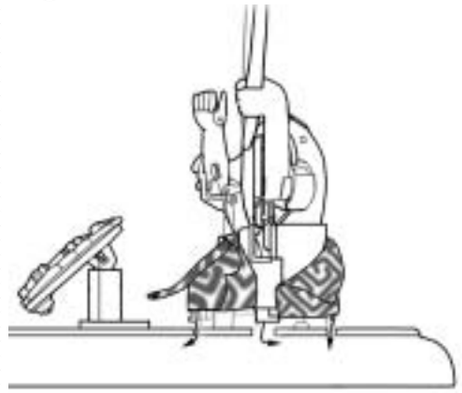
Put the both sides adhesive tape on only the lowest part of the lower body. (Put it on both sides.)

Fold the hem back and put it on the inside of the lower body (back).

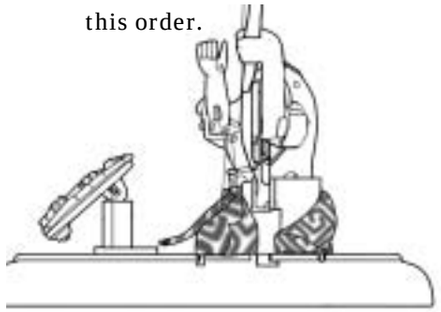
5 Combine the lower body (front) and the lower body (back).

◆ Put the projections of the lower body (back) in the holes in the lower body (front).

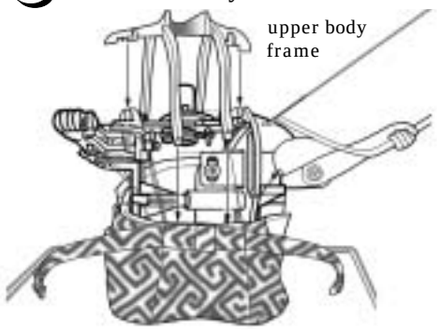
6 Set the five hooks under the lower body in the top panel.



7 While distorting the body a little, set the front hook, the side hook, and the rear hook in this order.

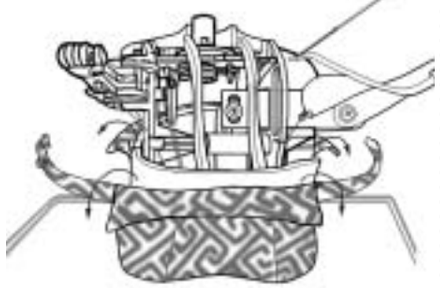


8 Set the upper body frame on the doll firmly.

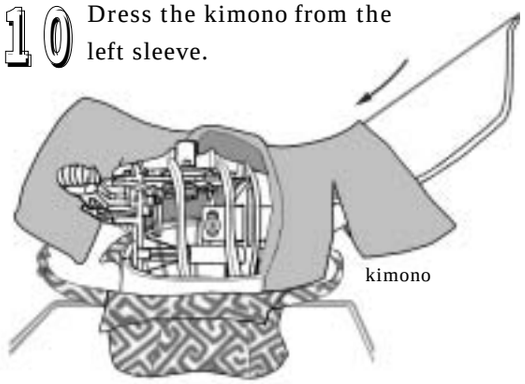


●Pay attention to the direction!

9 Fold down the upper part of the hakama to the outside.



10 Dress the kimono from the left sleeve.

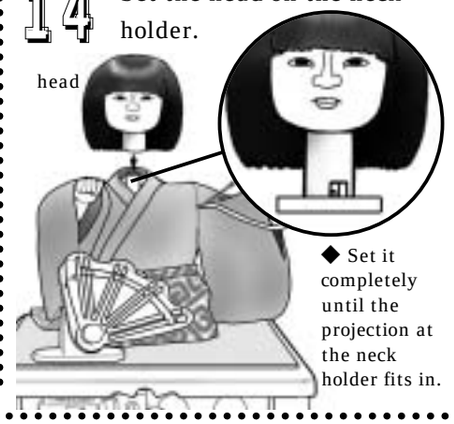


11 Put the right arm through the right sleeve and straighten each part. (Put the hem of the kimono into hakama.)

12 Turn up the folded hakama and fasten the snap at the neckline.

13 Fasten the belt at the back with a snap fastener.

14 Set the head on the neck holder.

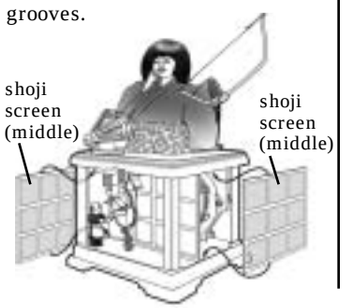


◆ Set it completely until the projection at the neck holder fits in.

15 Set the shoji screens.

① Slide the shoji screen (small) in the grooves in front of the front panel from the side.

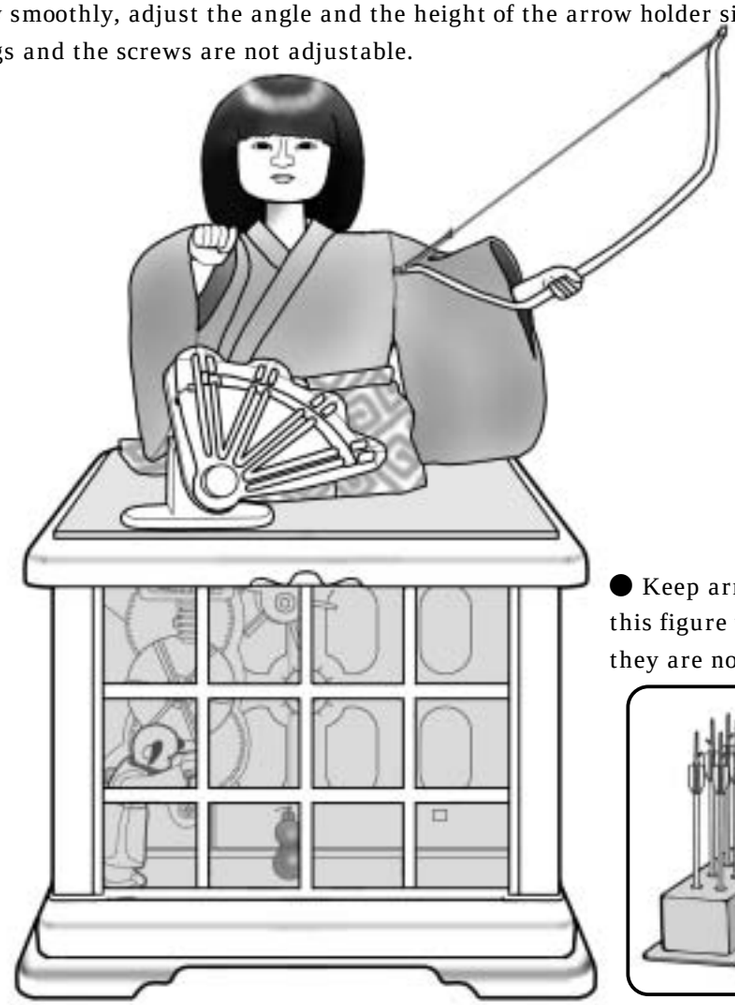
② Set shoji screens (middle) in the side grooves. Put the upper sides in the upper grooves first and then fit them in the lower grooves.



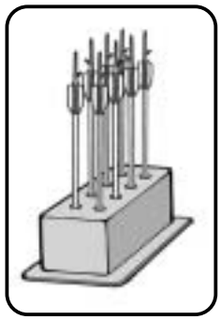
③ Set the shoji screen (large) in the front grooves. Put the upper side in the upper groove first and then fit them in the lower groove.

[Now the bow-shooting boy is complete!]

Test the motion of the doll after you dressed the doll. If it isn't able to take an arrow smoothly, adjust the angle and the height of the arrow holder since the strings and the screws are not adjustable.



● Keep arrows like this figure when they are not used.

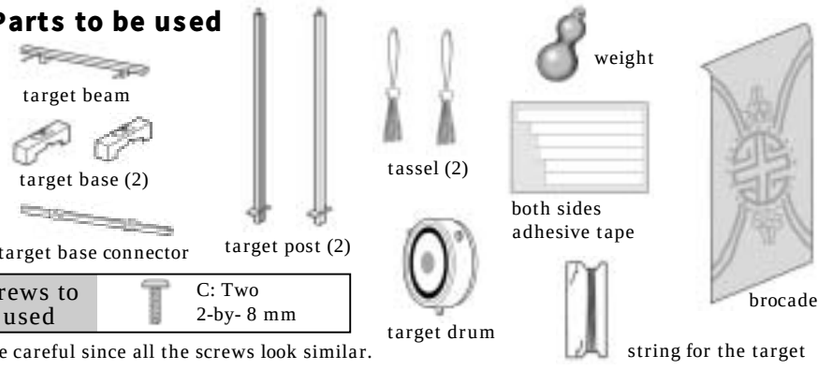


Notice

The motion might be changed after intervals even if it is adjusted perfectly. Please adjust the arrow holder before each operation.
(If it cannot be adjusted only by adjusting the arrow holder, undress the doll and follow the process from p.31 ~ p.44.)

Assembling the Target

●Parts to be used

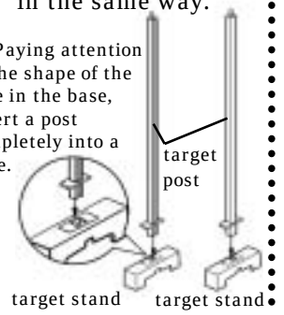


Screws to be used	C: Two 2-by- 8 mm

※Be careful since all the screws look similar.

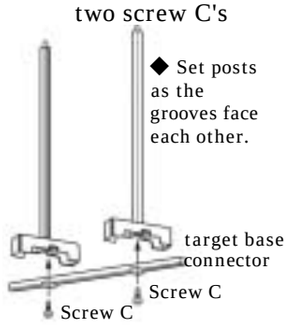
1 Stand a target post on a target base. Assemble both posts in the same way.

◆ Paying attention to the shape of the hole in the base, insert a post completely into a base.

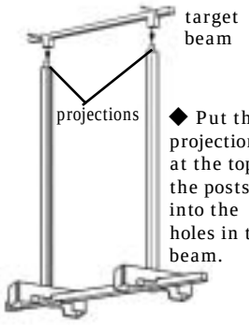


2 Fasten both bases to the target base connector with two screw C's

◆ Set posts as the grooves face each other.

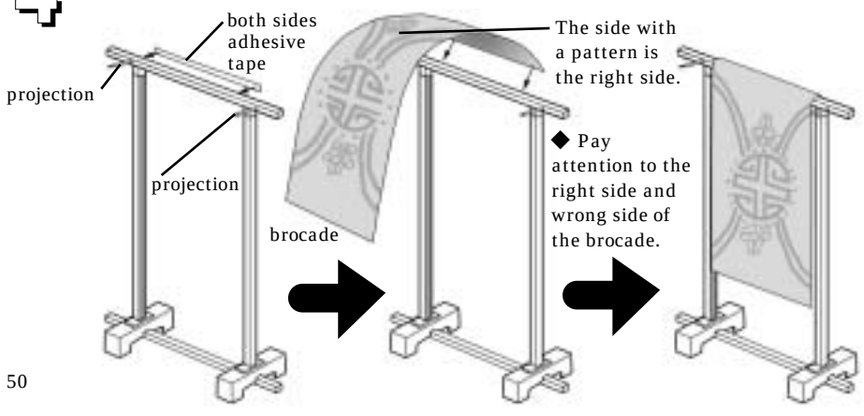


3 Attach the beam on the posts.



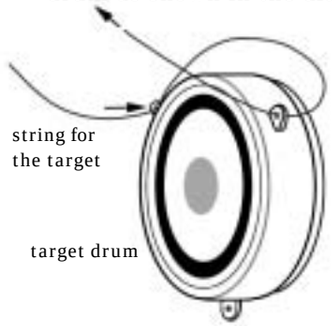
◆ Put the projections at the top of the posts into the holes in the beam.

4 Put the brocade on the beam with a both sides adhesive tape.



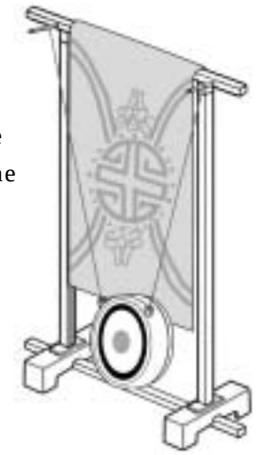
◆ Pay attention to the right side and wrong side of the brocade.

5 Put the string for the target through the hole in the target drum as shown in the diagram.

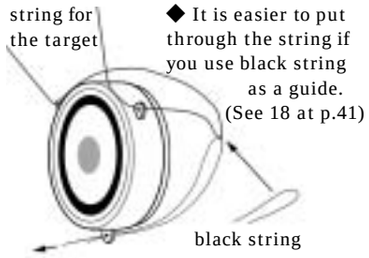


6 Tie both ends of the string to the projections at the beam.

◆ Knot the string for the target in the usual way. Clip the end of the string short.

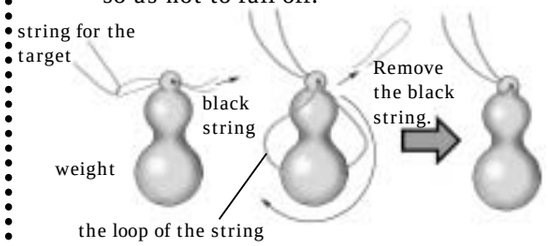


7 Put the middle of the string through the hole under the drum.

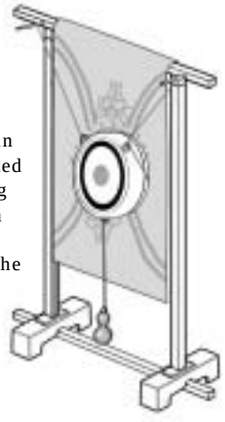


◆ It is easier to put through the string if you use black string as a guide. (See 18 at p.41)

8 Put the middle of the string through the hole in the weight. Then put the weight through the loop of the string so as not to fall off.

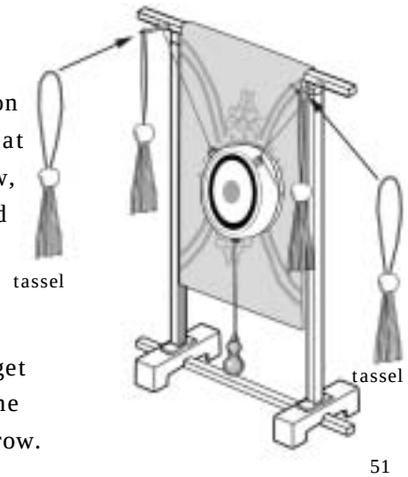


9 Raise the target to the suitable height.



◆ The height can be adjusted by sliding the drum while holding the weight.

10 Hang tassels on the projection at the beam. Now, you've finished the target!



※ Set the target according to the carry of an arrow.

[Regarding the Pre-assembled Product]

Although products are shipped after testing the motion, they need to be initially adjusted before operating since they use strings. Please check the motion before dressing the doll by the following directions.

After the motion is checked, follow the process and dress the doll. (It is recommended that final adjustments be made before giving a performance since the motion may be affected by dressing.)

★When you open the box…

1. Check the contents. The contents are as follows:
body, a set of kimono <kimono, hakama (front), hakama (train), hakama (back)> lower body (front), lower body (back), upper body frame, both sides adhesive tape, small shoji screen, large shoji screen, middle shoji screen (2), arrow (8), arrow stand, target beam, brocade, target drum, string for the target, black string, weight, tassel (2), winding knob, tweezers, oil, cross-headed screw driver, peg driver, operating manual
2. Take the body out of the box and remove the wire at the gourd-shaped weight attached to the panel in the pedestal.
(The weight becomes suspended with the fine transparent string. Check that the weight goes up and down when the arrow holder moves. If it doesn't, remove it with the string and put the wire around the pulley's shaft again.)
3. Remove the head cover. (Don't throw the cover away since it is used afterward as a head cover to prevent the hair from spreading.)

★Checking the motion

1. First, check the sequence of motions with pictures. (See p.30.)
2. Wind the mainspring to the full extent and set arrows on the arrow holder paying attention to the direction of the hook. (See p.45.)
3. Turn the switch down and check both the single shoot and the four shoots in succession. (See p.45.)

★Tie the left arm and the left body with black string.

1. Tie black string under the left arm and tie it to the left body.
(See 19 at p.41 and 22 at p.42. The process can be done with the left arm attached though it is not attached in the diagram.)
2. Fasten the left arm as shown in the diagram and adjust the length of the string.
(See 23 and 24 at p.42.)

★If it doesn't go well

● Adjust the position of the arrow holder and the right arm so that the doll can grasp the arrow at a right angle. (See p.43 ~ p.44.)

• When stopping the motion halfway to adjust, fasten the bladed wheel at the lower part of the pedestal with a clothespin. (See 23 at p.42.)

※ If it doesn't go well after adjusting the arrow holder and the right arm.

● Adjust the strings again and make sure that the right arm moves smoothly like the sequence of pictures at p.30. (See p.29 ~ p.37.)

• Be sure to understand the role of each cam plate before the adjustment.

• Adjust the tension of strings with pegdriver following the process while watching the overall motion.

★Dressing the doll and set shoji screens.

1. Remove the head and set the hakama on the pedestal and the lower bodies. Set the bodies on the pedestal. (See p.46.)
2. Dress the kimono and set the head again and then set shoji screens. (See p.47~p.48.)

★Assembling the target

1. Put the brocade on the beam with a piece of both sides adhesive tape. (See 4 at p.50.)
2. Set the target drum and the tassels. (See p.51.)

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