

Required tool

Scissors, ruler, cutting knife, glue.

The tool which recommends using

5mm eyelet, and Eyelet punch

Material

A4 Paper (0.215mm=180g²/m)

Wooden stick (4mm in diameter, About 2m in full length)

String 2~4m in length

Directions of diagram

Cutting line _____

Folding outside - - - - -

Folding inside - · - - - -

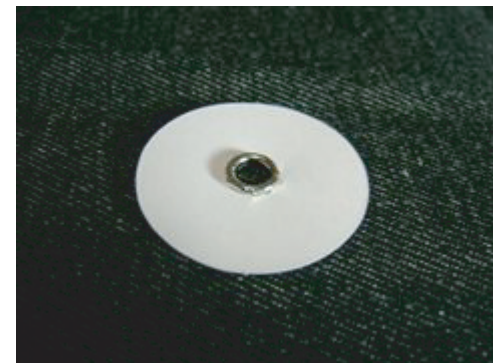
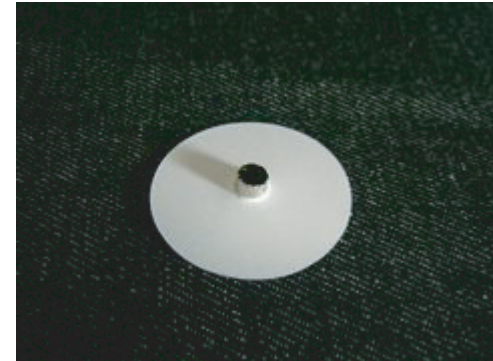
Reference point of glue ●

Cautions

Take great care, when you treat an edged tool.

Ventilate the room, when you use adhesives.

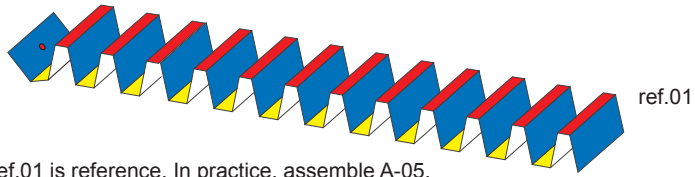
How to use Eyelet



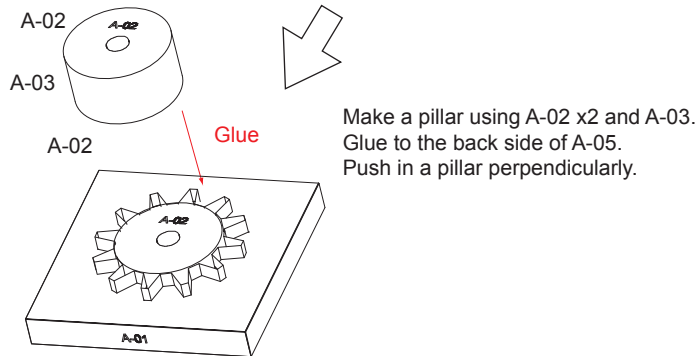
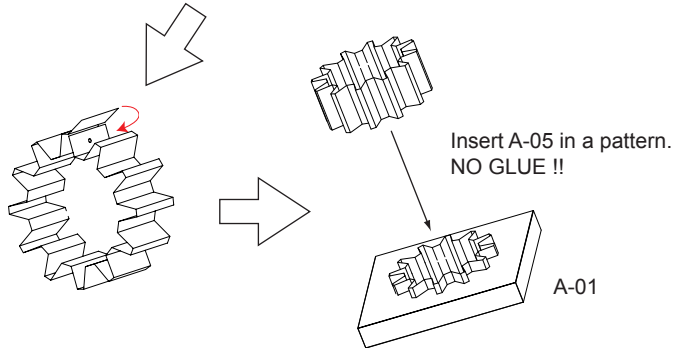
12teeth Gear

1

At first, assemble 12teeth Gear Type- A.
Parts number are A-01 ~ A-07.

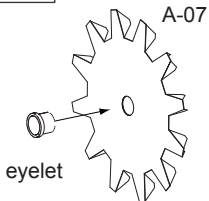


ref.01 is reference. In practice, assemble A-05.



2

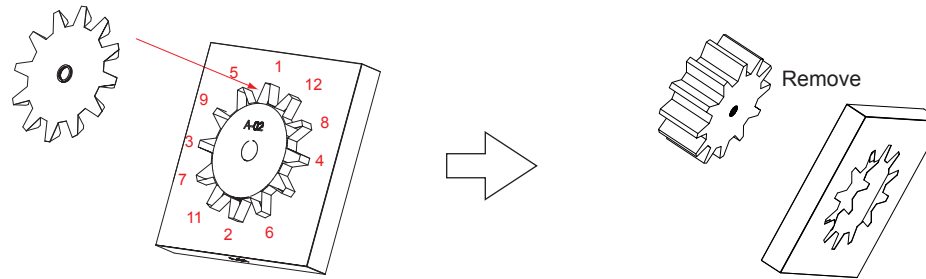
In the case of using eyelet.
Use eyelet only for one of the two of A-07.



Use 5mm eyelets. However, an inside diameter is 4.5mm.
Eyelets which a stick 4mm in diameter rotates smoothly.

3

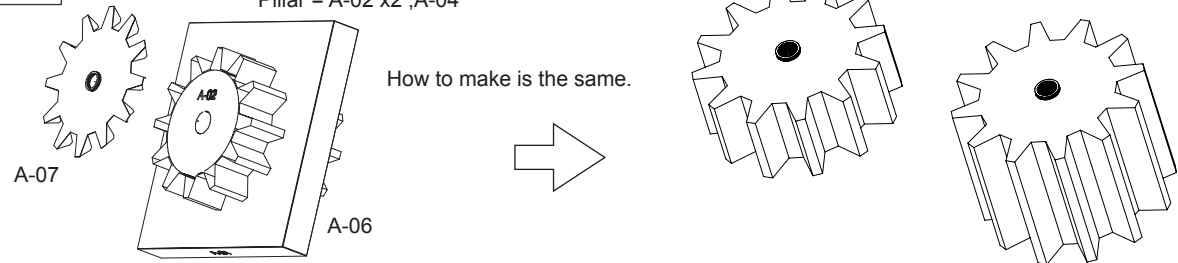
Glue A-07 to both sides in order of a diagonal.



A red number is an example of glue.
An important point is equalizing distance from the center.
Assemble in order of a diagonal similarly with subsequent gears.

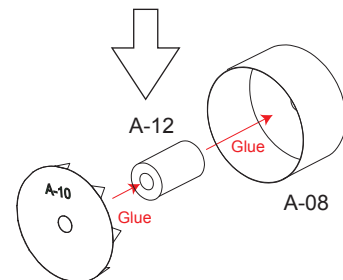
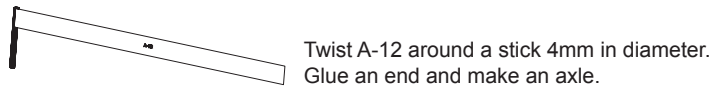
4

Assemble 12teeth Gear Type-A(wide)
Pillar = A-02 x2 ,A-04



5

Next, assemble 12teeth Gear Type-B.
Parts number are A-08 ~ A-12.

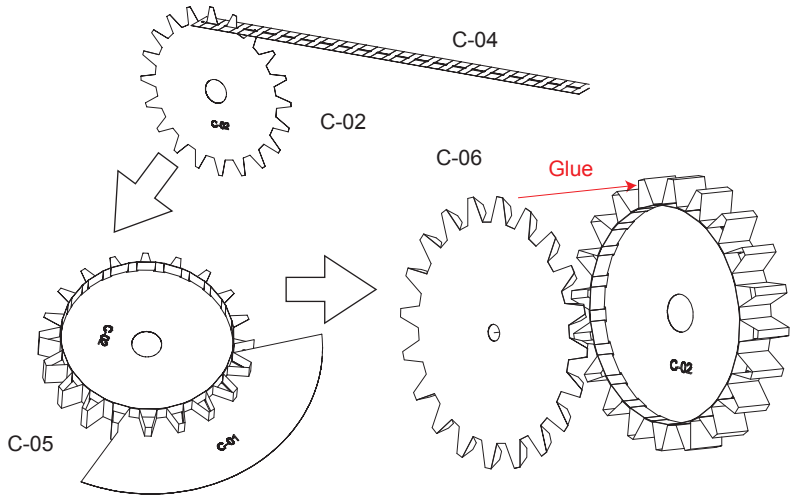


The differences between Type-A and Type-B are an inner pillar and the existence of eyelet.
As for Type-B, an axle hole enters into a pillar.
And eyelet is **not** used for Type-B.
Others are the same methods of structure.
Refer to how to make Type-A and assemble two Type-B Gear.

15teeth, 20teeth, 40teeth and 45teeth Gear

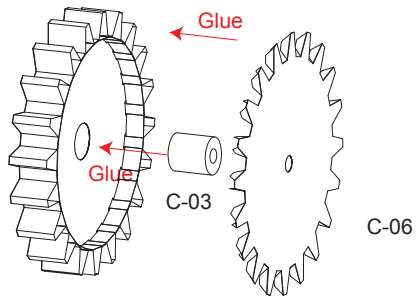
6 Since it is the same as 12teeth Type-A, how to make 15teeth Gear is omitted.
Make 15teeth Gear for 12teeth Type-A to reference.
Parts number are B-01 ~ B-07.

7 How to make 20teeth Gear.
Parts number are C-01 ~ C-06.



Glue C-01 together.
Glue C-05 to C-04.
Use C-01 as a pattern then.

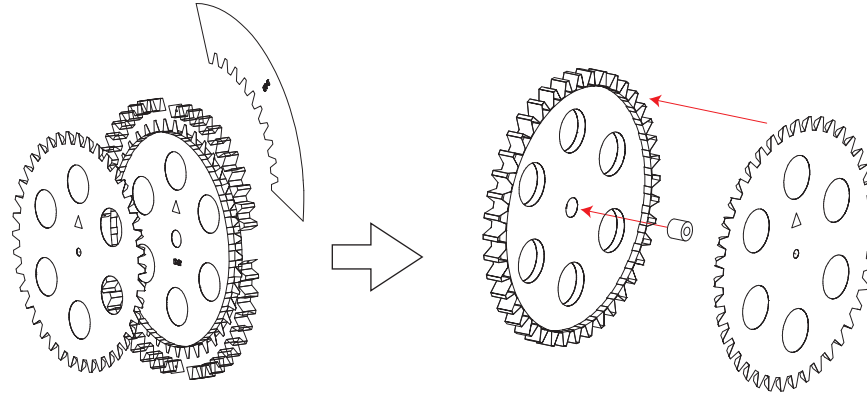
Glue C-06 to C-05 in order of a diagonal.
Eyelet does not use with 20 teeth Gear.



Twist C-03 around a stick 4mm in diameter.
Glue an end and make an axle hole.

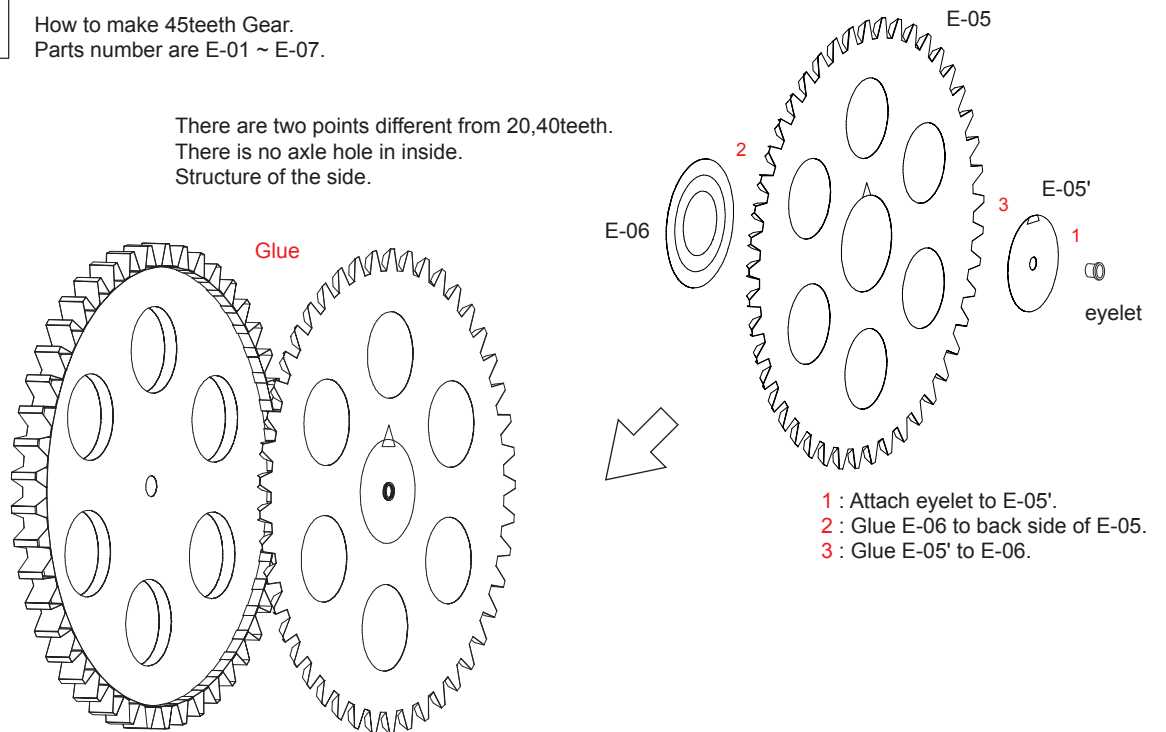
8 How to make 40teeth Gear.
Parts number are D-01 ~ D-06.

It is the same method of structure as 20teeth Gear.



9 How to make 45teeth Gear.
Parts number are E-01 ~ E-07.

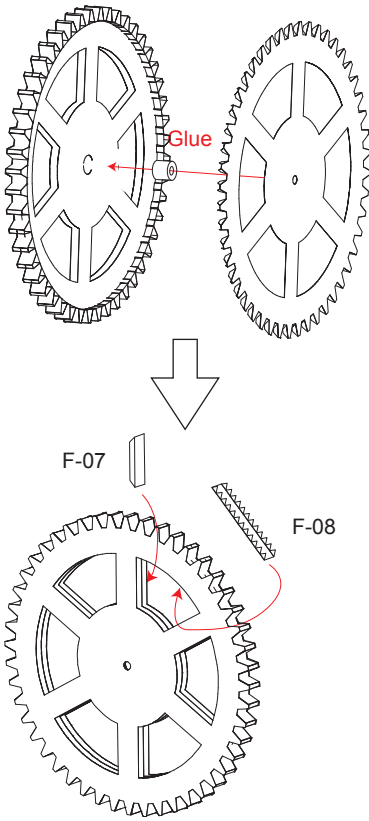
There are two points different from 20,40teeth.
There is no axle hole in inside.
Structure of the side.



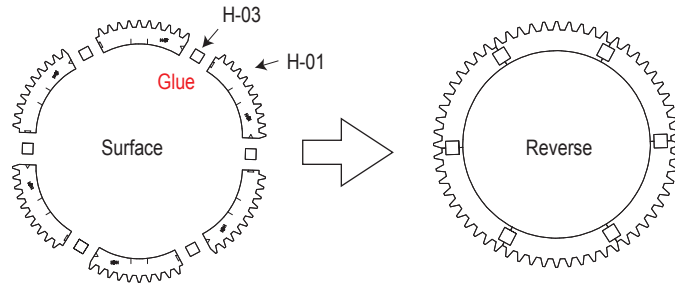
- 1 : Attach eyelet to E-05'.
- 2 : Glue E-06 to back side of E-05.
- 3 : Glue E-05' to E-06.

48teeth and 60teeth Gear

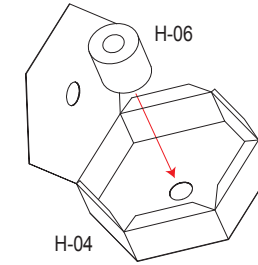
10 How to make 48teeth Gear Type-A.
Parts number are F-01 ~ F-08.



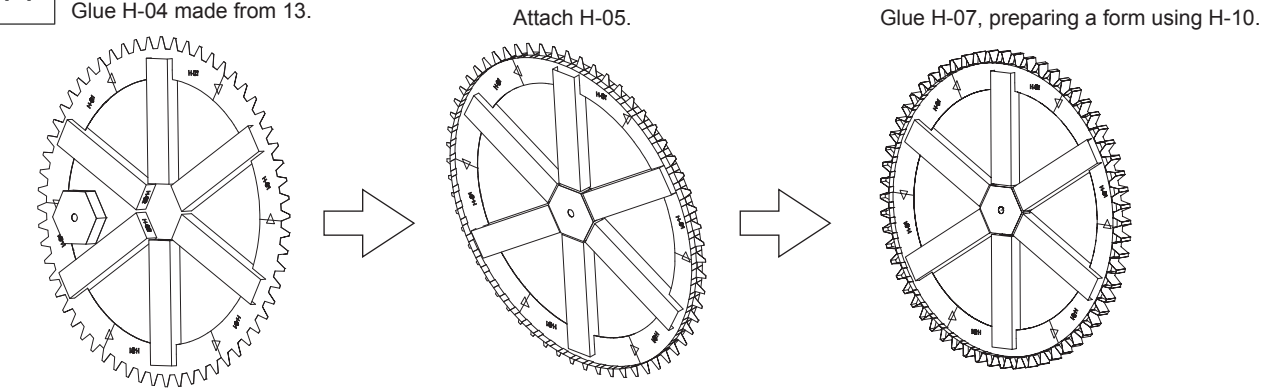
12 How to make 60teeth Gear Type-A.
Parts number are H-01 ~ H-12.



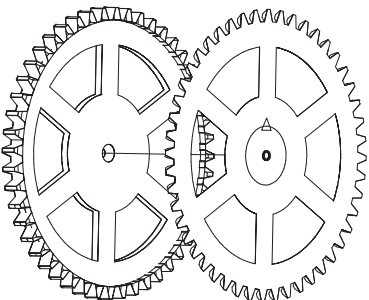
13



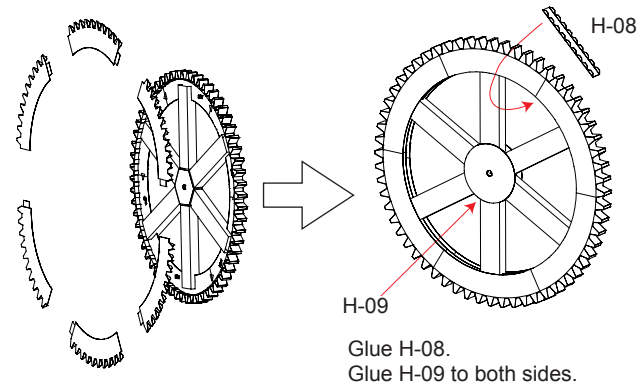
14 Put H-02 to the slit of H-01
Glue H-04 made from 13.



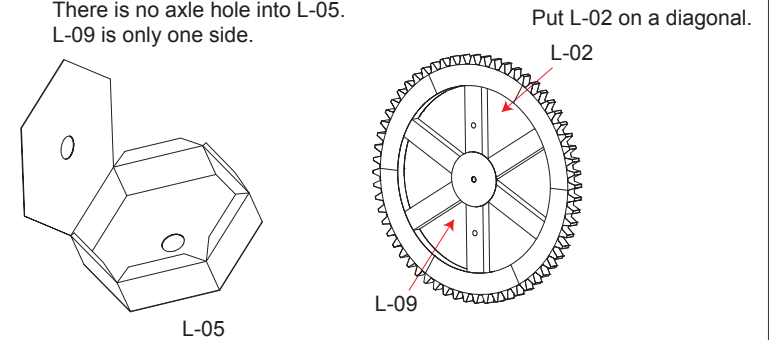
11 How to make 48teeth Gear Type-B.
Parts number are G-01 ~ G-08.
Refer to Type-A and assemble it henceforth.



15 At First, Glue H-12 and H-03 in the shape of a ring.
Next, Glue it to H-07.
Assemble the opposite side similarly using H-11 and H-03.

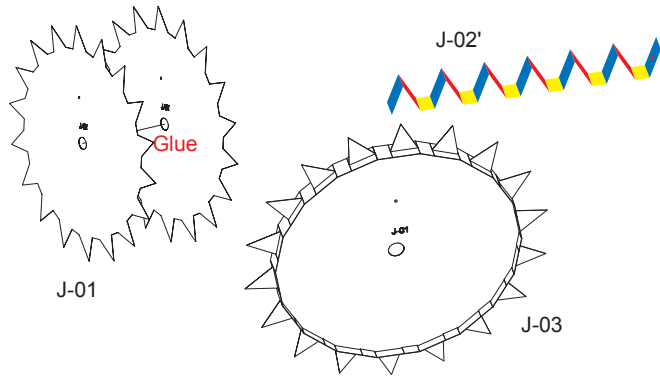


16 How to make 60teeth Gear Type-B.
Parts number are L-01 ~ L-11.
The difference from Type-A.
A hole is on a pillar. (L-02)
There is no axle hole into L-05.
L-09 is only one side.

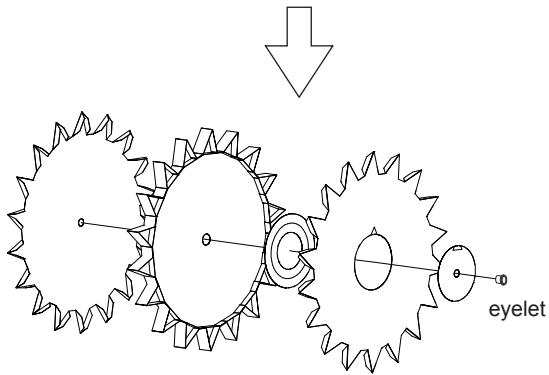


Escapement and Ratchet

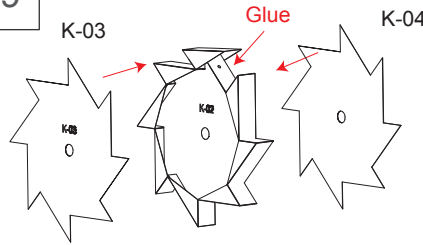
17 How to make Escapement.
Parts number are J-01 ~ J-07.



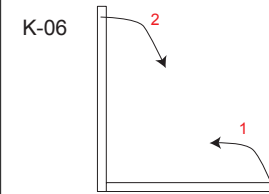
J-02' is reference. In practice, assemble J-02.
Direction cautions!!
Glue J-02, preparing a form using J-07.



19 K-03 K-04
Glue



20 Paper spring

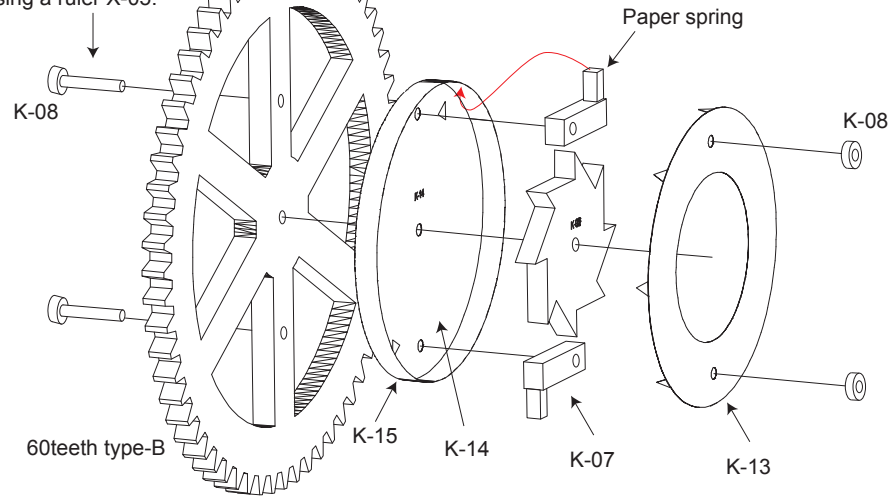


Glue the end of K-06.
Fold by turns to an end.
Glue an end.

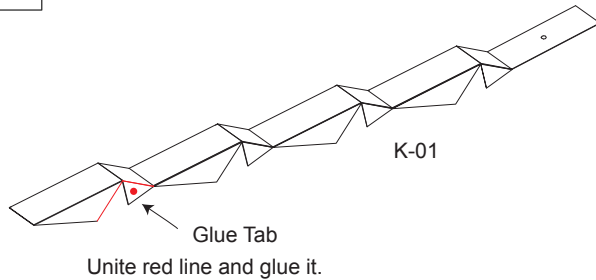
21

Cut a stick using a ruler X-05.

Glue paper spring to K-07.
Glue spring to K-15 together with a triangular mark.

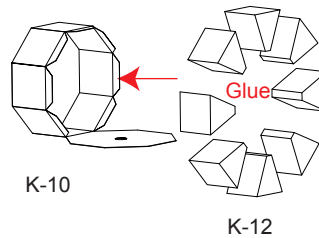


18 How to make Ratchet.
Parts number are K-01 ~ K-15.



Glue Tab
Unite red line and glue it.

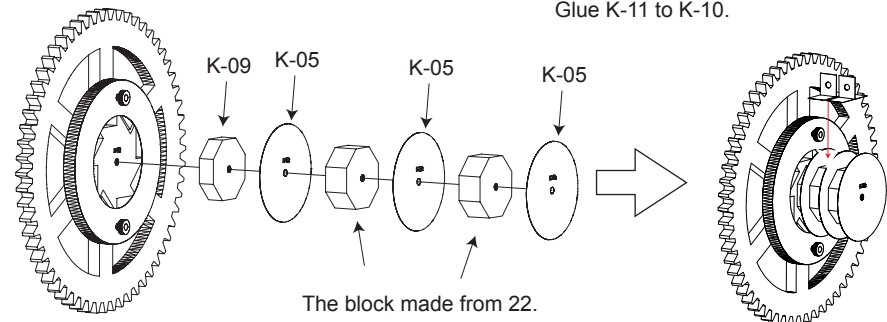
22 Make two sets.
Glue



23

Unite a center and glue.

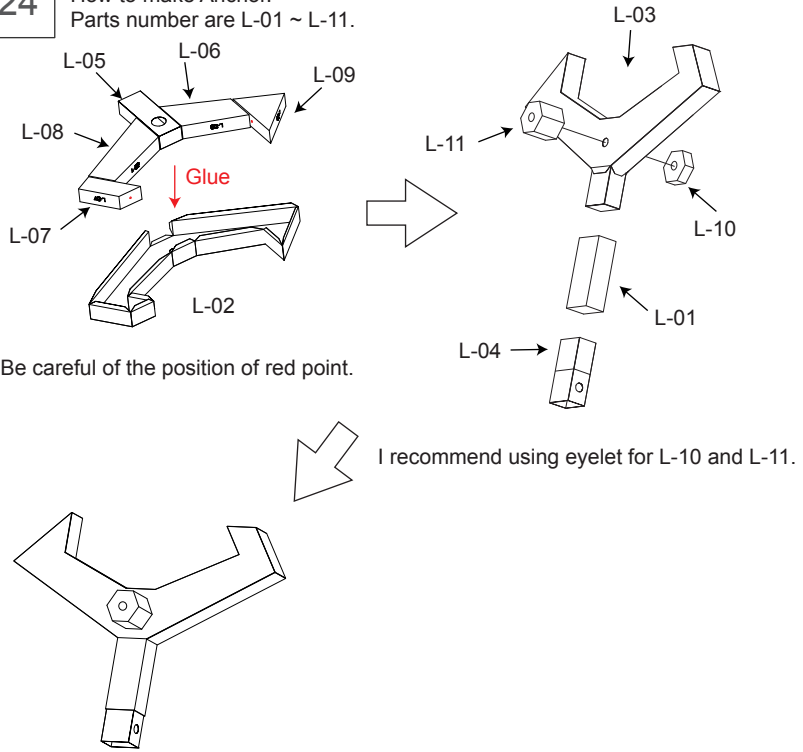
I recommend using eyelet to the hole of K-11.
Glue K-11 to K-10.



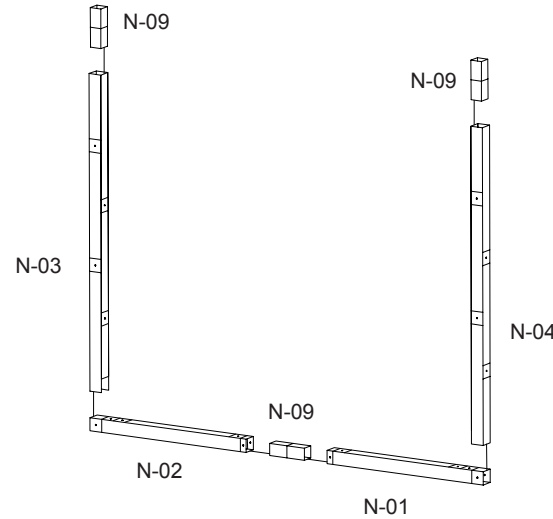
The block made from 22.

Anchor and Pendulum

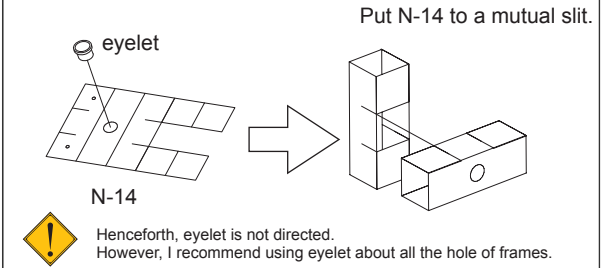
24 How to make Anchor.
Parts number are L-01 ~ L-11.



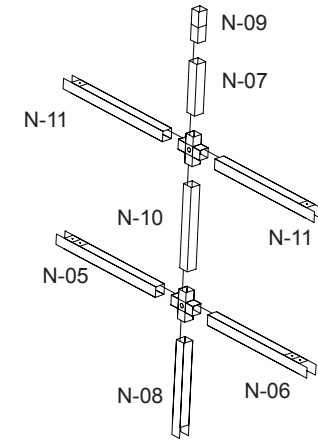
26 How to make Frame A-01.
Parts number are N-01 ~ N-18.



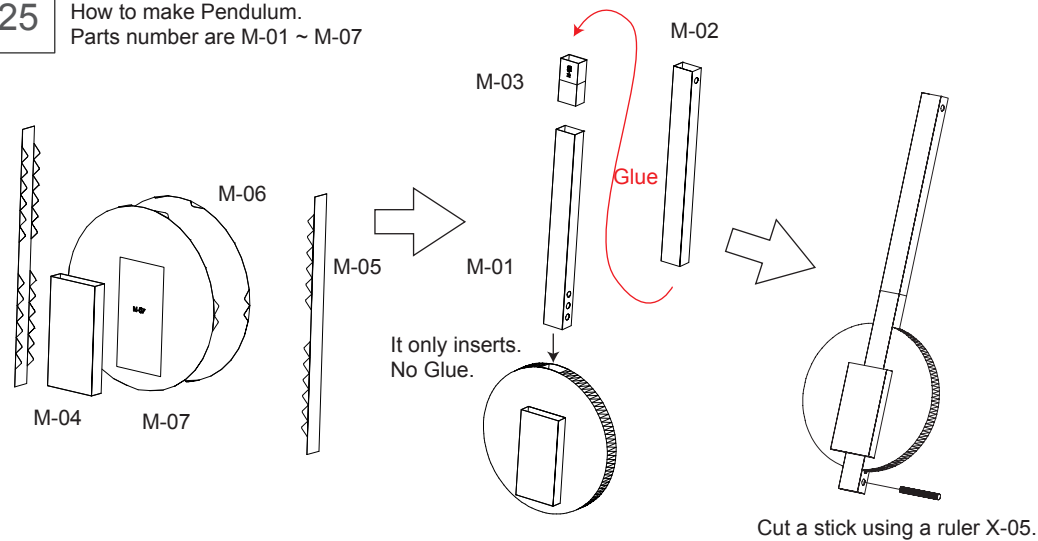
27 Make three sets.



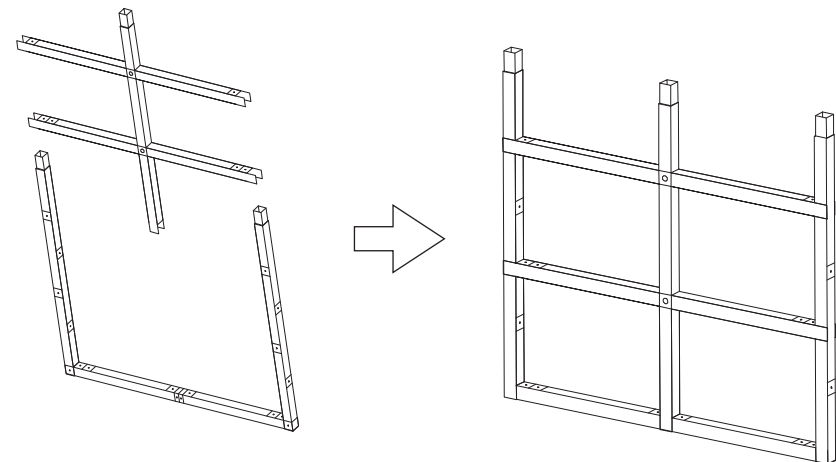
28



25 How to make Pendulum.
Parts number are M-01 ~ M-07.

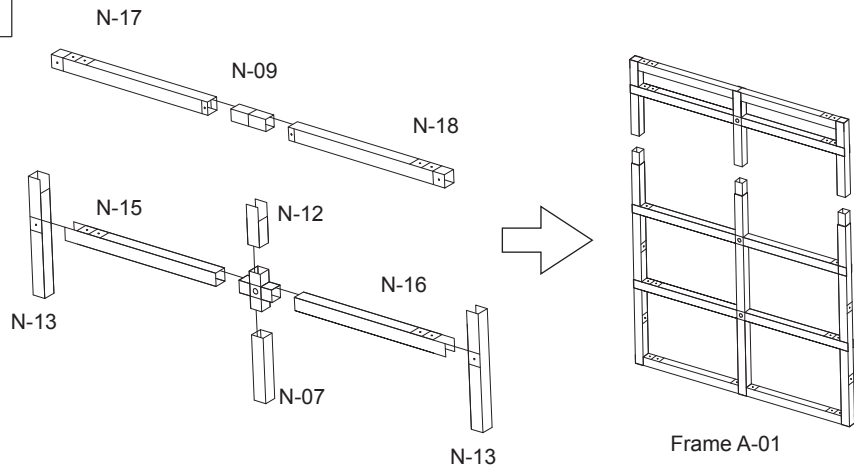


29

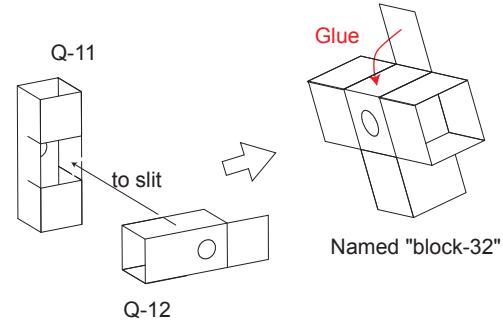


Frame A-01 and A-02 and A-04

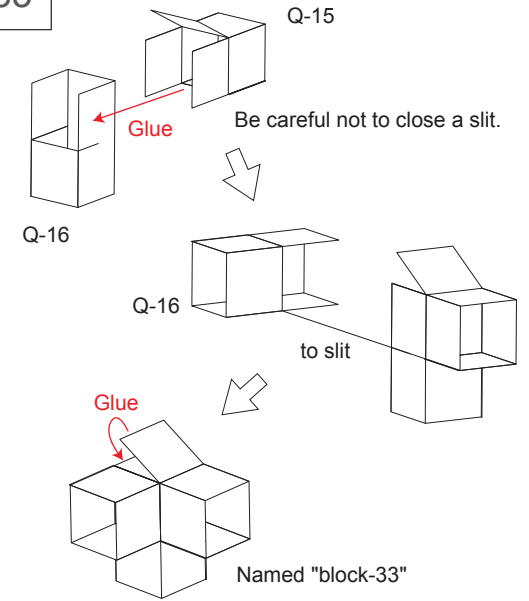
30



32

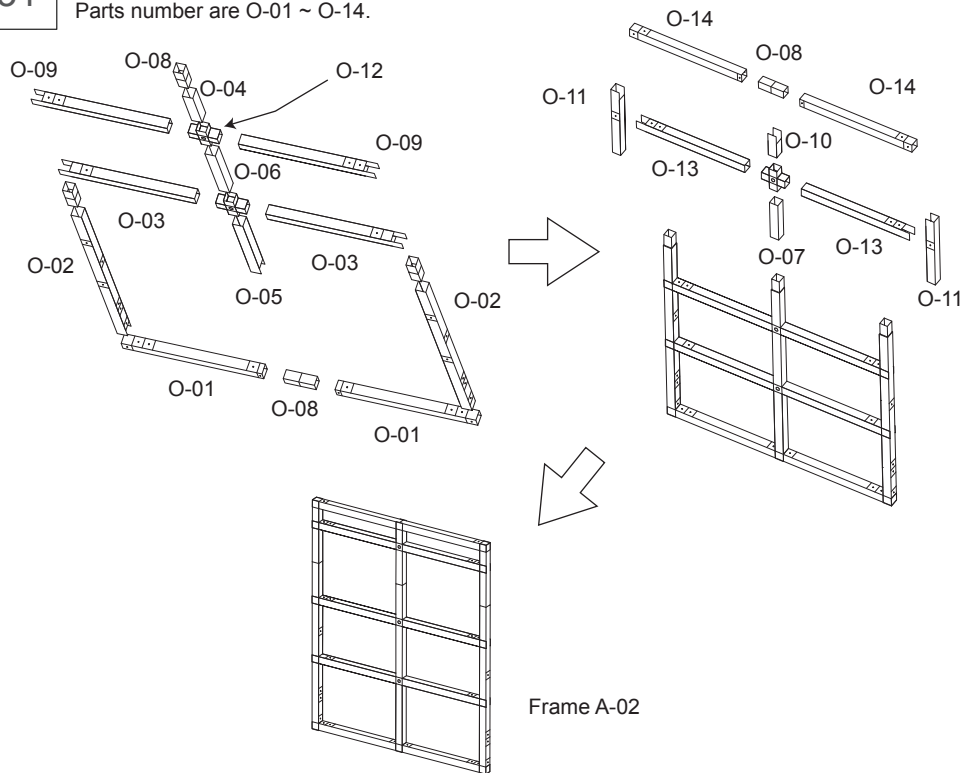


33

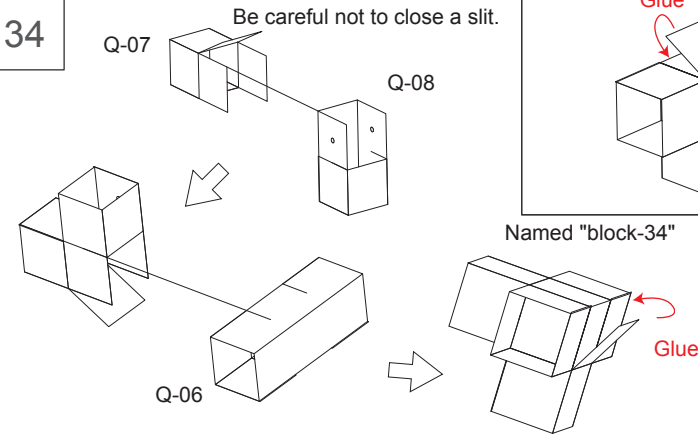


31

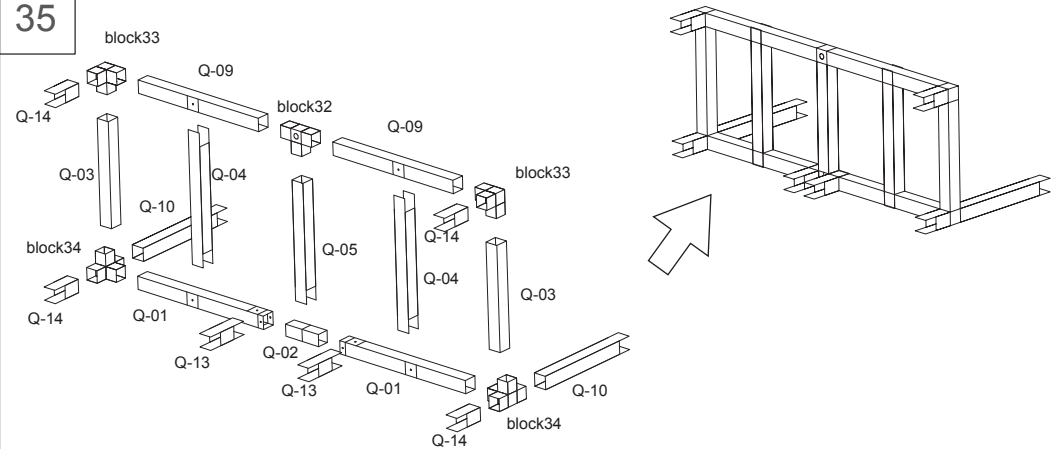
How to make Frame A-02.
Parts number are O-01 ~ O-14.



34



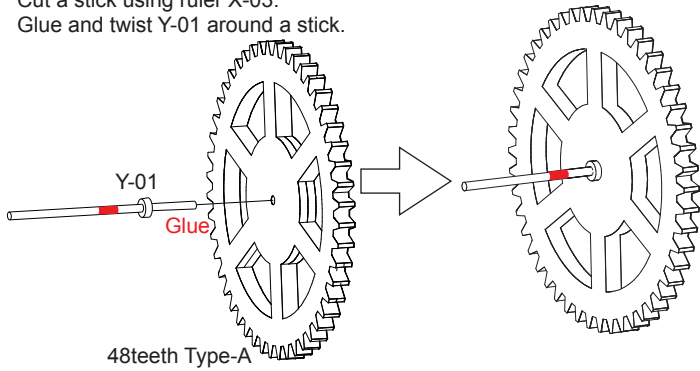
35



Assemble Frame A

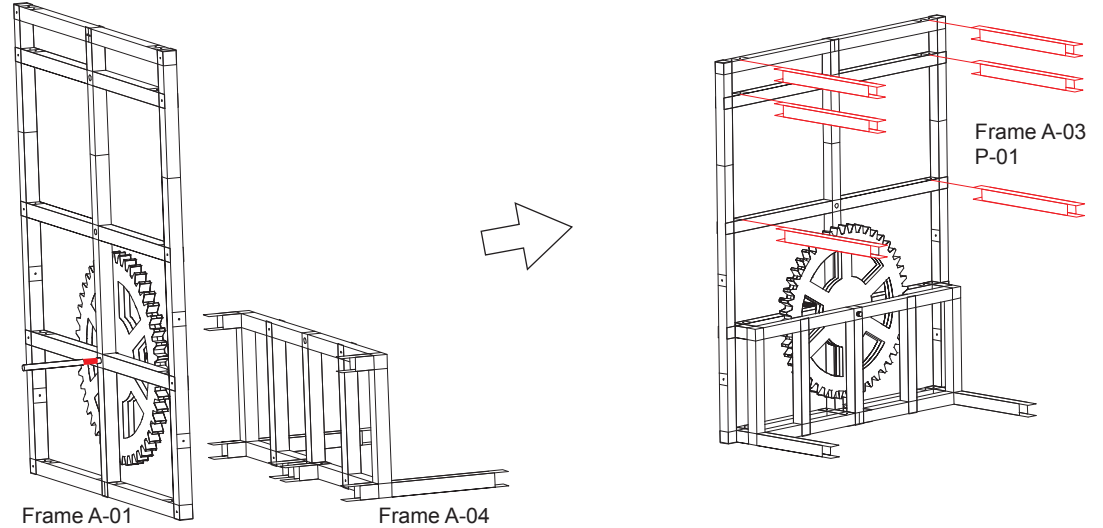
36

How to assemble A-01 and A-04.
Cut a stick using ruler X-03.
Glue and twist Y-01 around a stick.

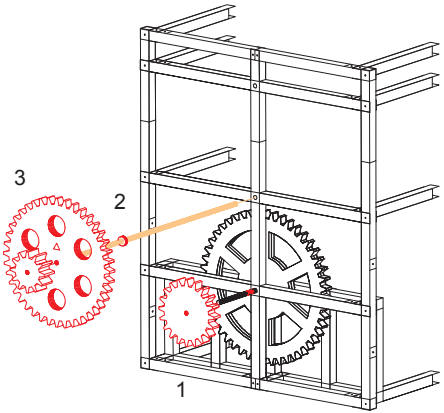


Fix completely so that an axis and the gear do not slide.

37

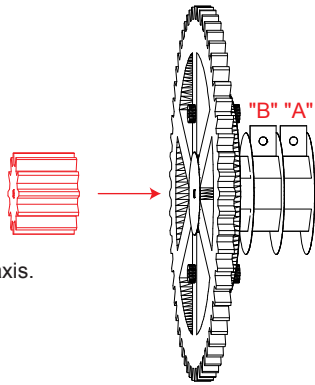


38



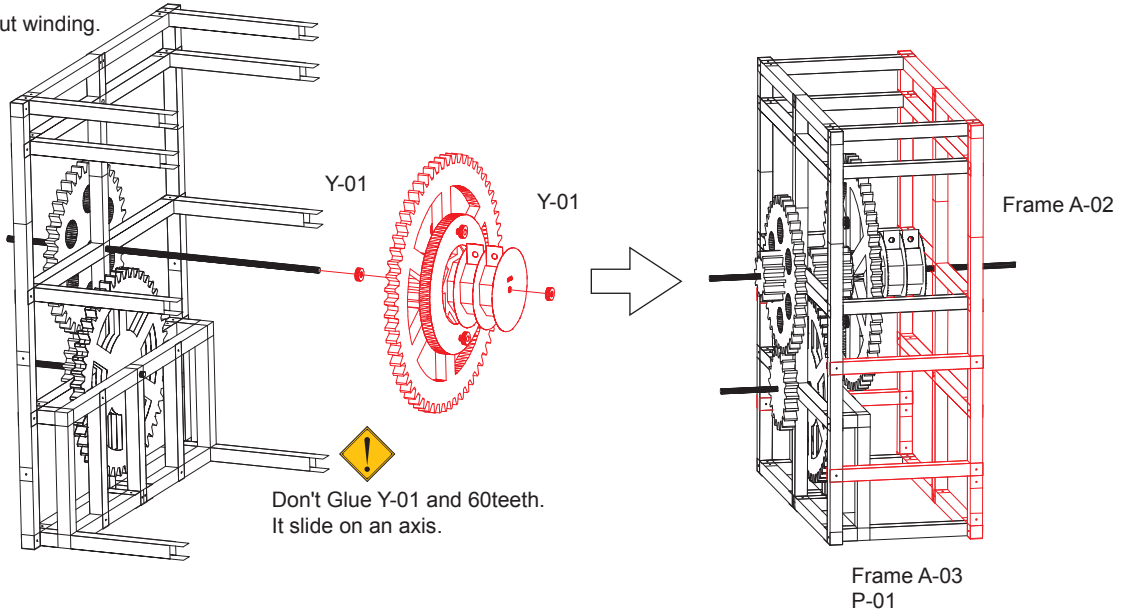
Prepare two strings of the same length.
When a string's length is 1m, a clock moves for about 1 hour.
When a string's length is 2m, a clock moves for about 2 hour.
Connect one to "A" and roll it clockwise.
After that, connect one more to "B".

Cautions :
Hang down one more counterclockwise without winding.



Glue 12teeth Gear Type-A(wide).

1. Glue 20teeth Gear at the place of the red mark of an axis.
20teeth Gear is interlocked with 48teeth Gear Type-A.
2. Cut a stick using ruler X-02.
Glue and twist Y-01 around a stick.
3. Glue 40teeth Gear to side of Y-01.
Glue 12teeth Gear type-B to 40teeth Gear.
40teeth Gear and 12teeth Gear is interlocked with axis.

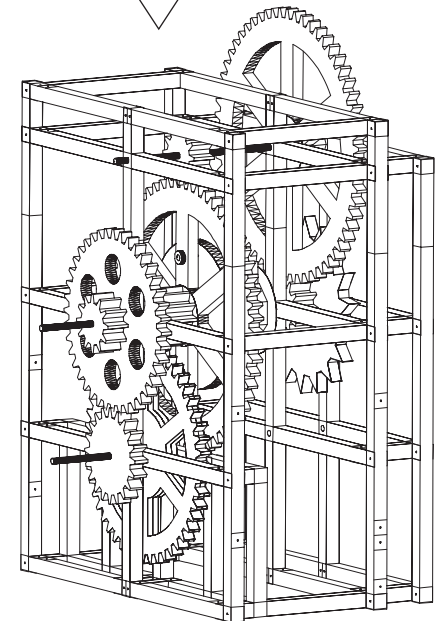
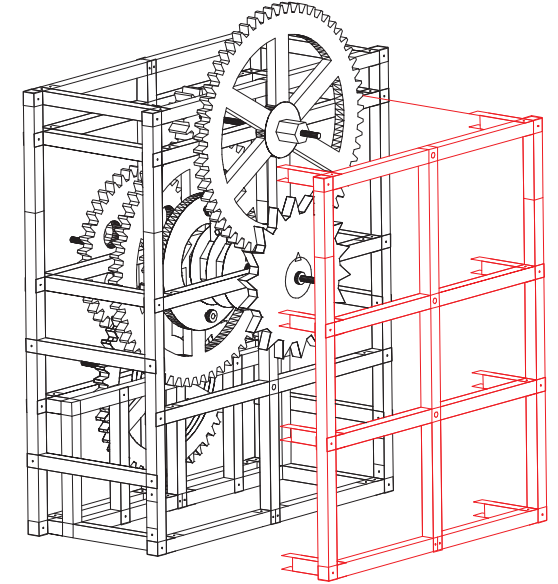
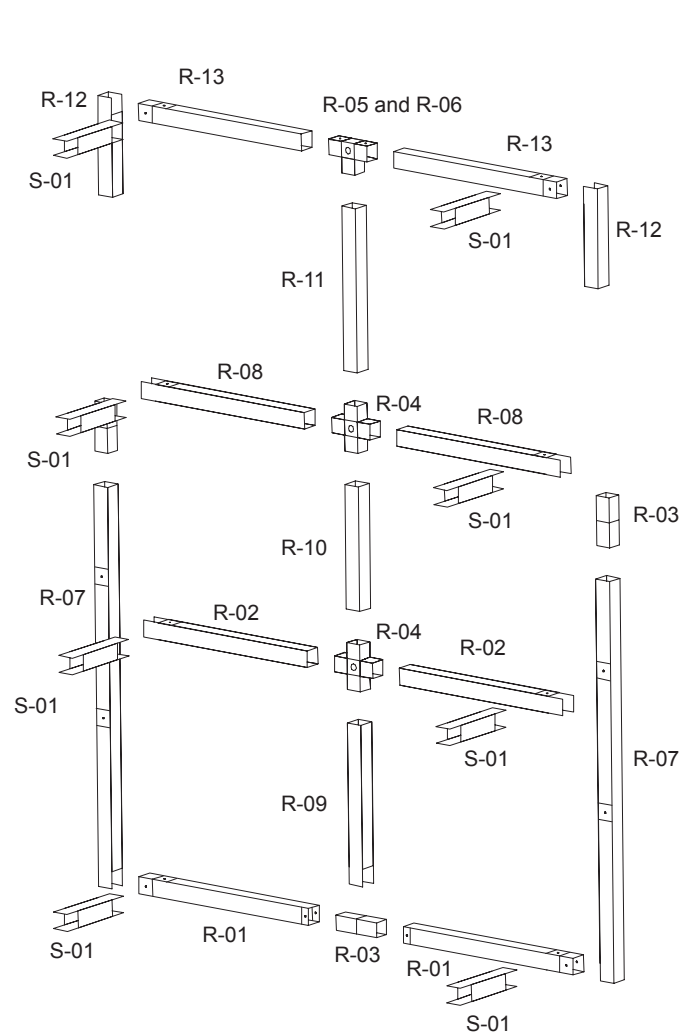
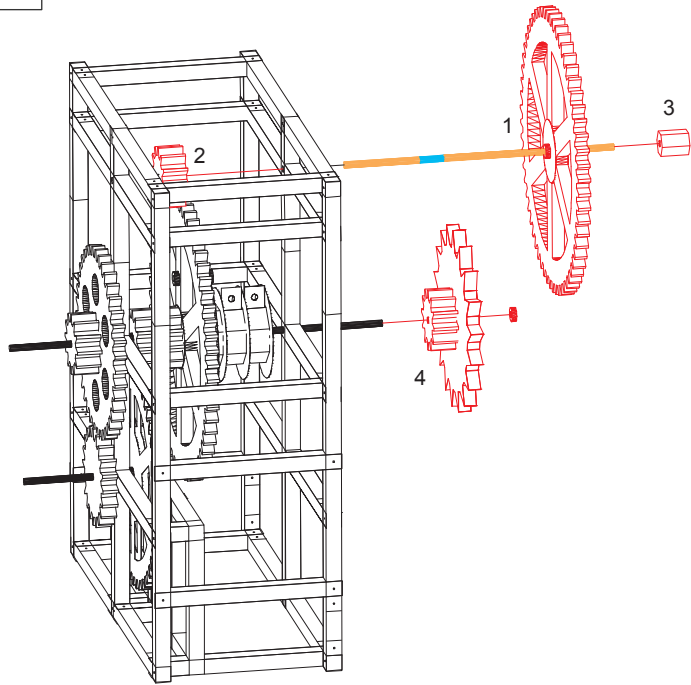


Don't Glue Y-01 and 60teeth.
It slide on an axis.

Assemble Frame B

39

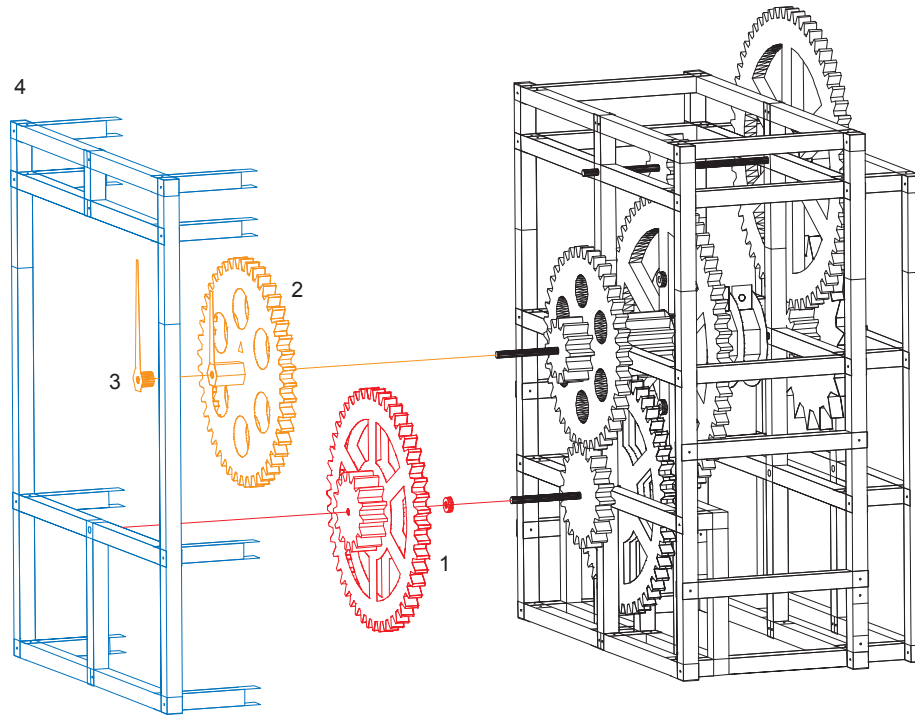
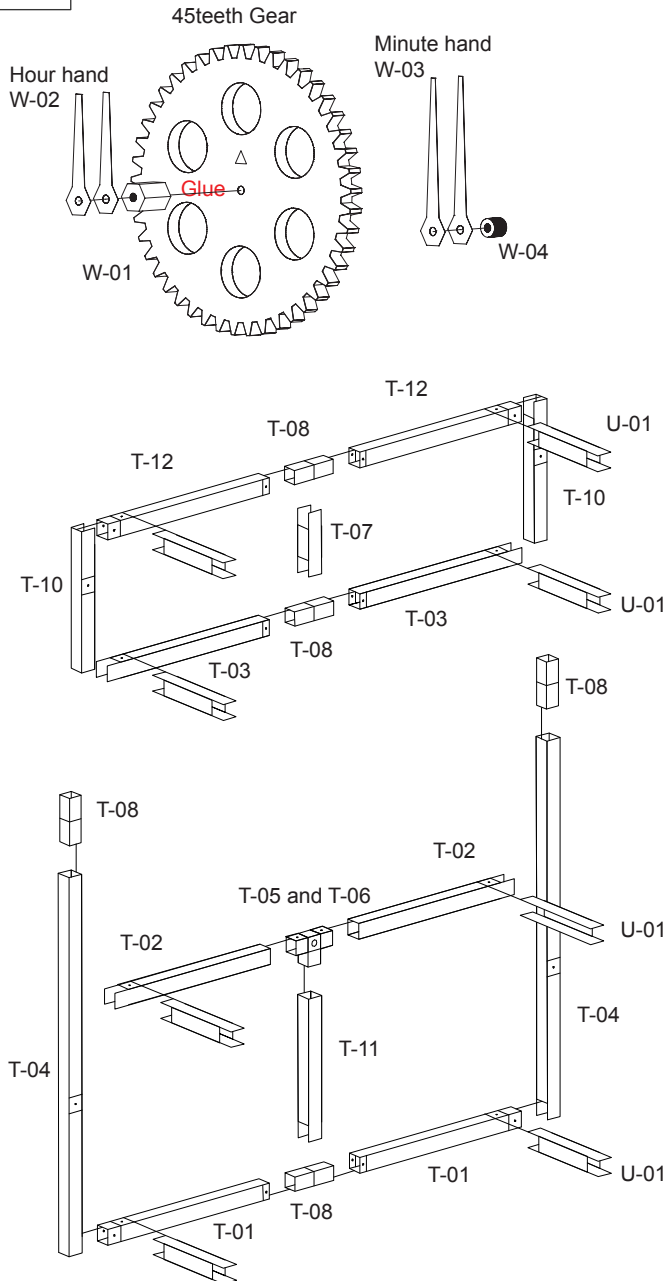
How to assemble Frame B



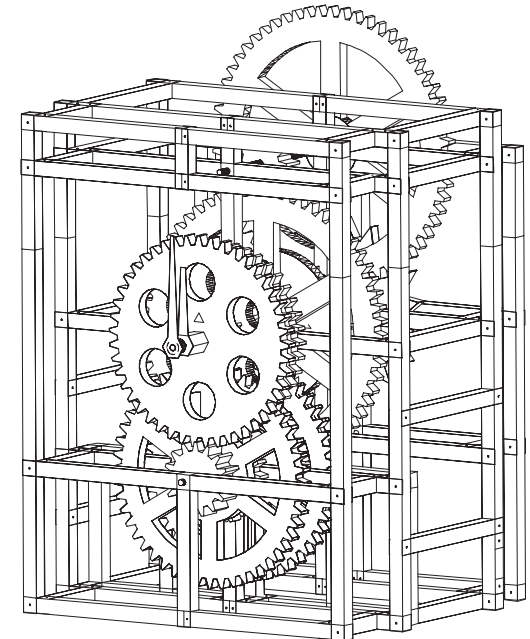
1. Cut a stick using ruler X-01.
Glue and twist Y-01 around a stick.
Glue 60teeth Gear Type-A to side of Y-01.
Let an axis pass to the hole of a Frame.
2. Glue 12teeth Gear Type B on the mark of an axis.
3. Put H-13 to an axis.
Don't Glue it.
4. Glue 12teeth Gear Type-A to the surface not using eyelet of Escapement.
Put Y-01 to an axis.
Don't Glue it. It slide on an axis.

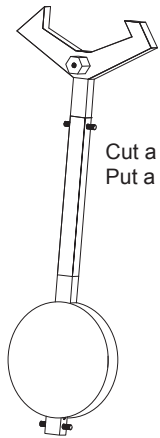
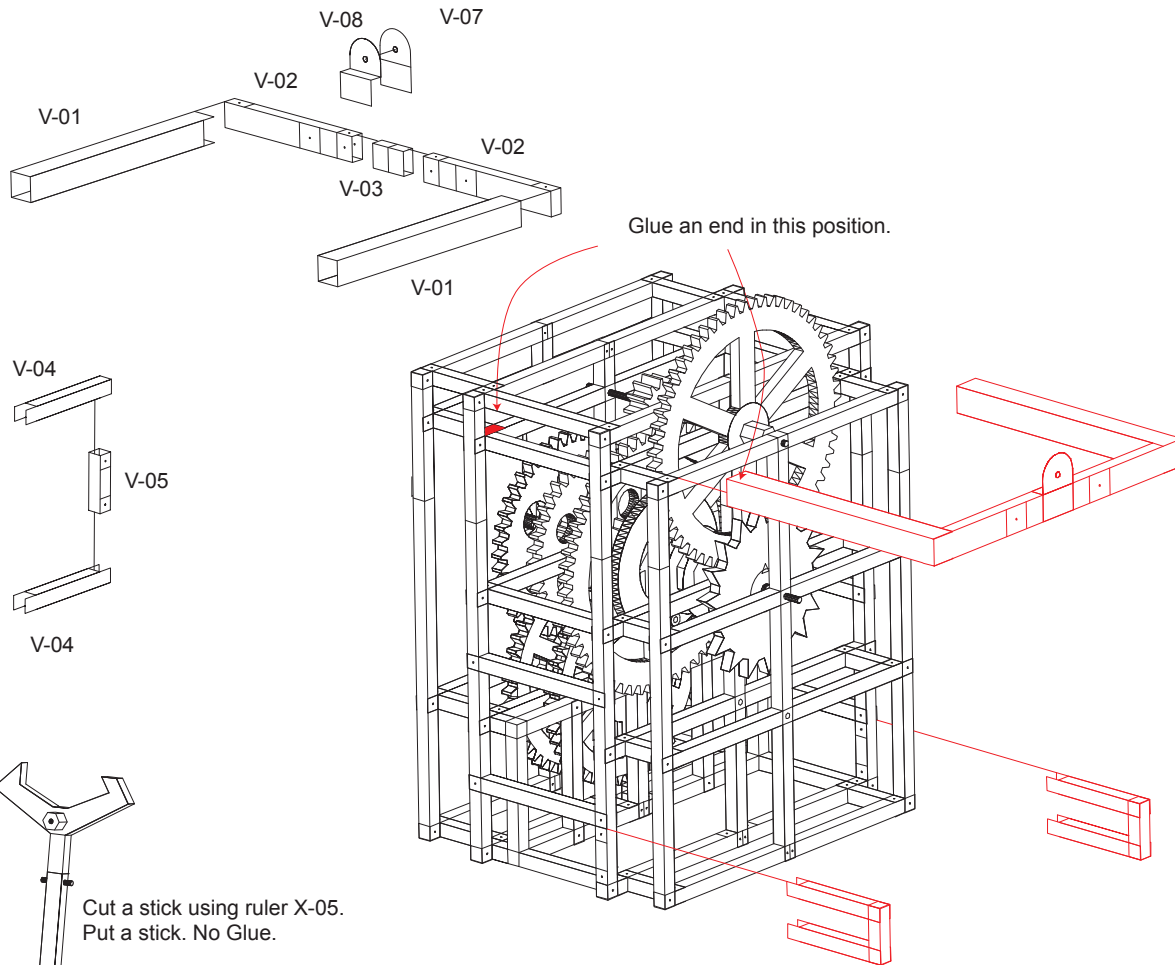
Assemble Frame C

40

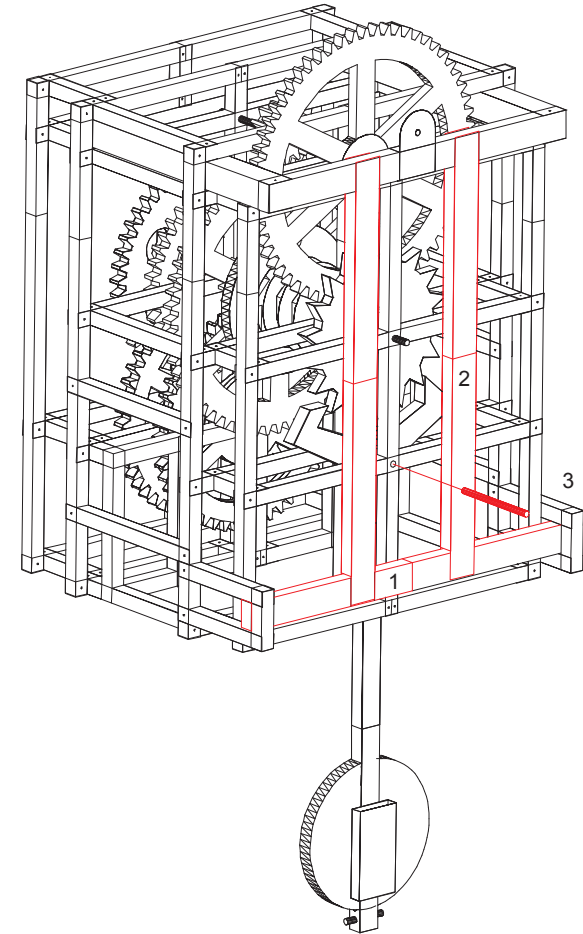


1. Put H-13 to an axis. Don't Glue it.
Glue 15teeth Gear to 48teeth Gear Type-B.
Don't Glue this gear to axis.
2. Put 45teeth Gear to an axis. Don't Glue it.
3. Fix the minute hand to the end of an axis.
The minute hand rotates together with an axis.
4. Glue Frame C.





Cut a stick using ruler X-05.
Put a stick. No Glue.

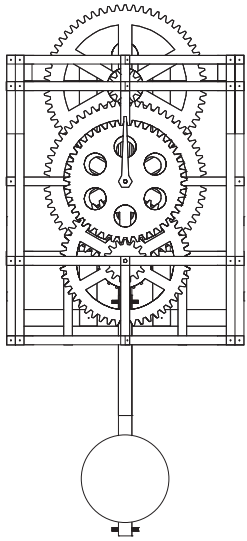


1. V-03 and V-06
Glue an end.
2. V-09 and V-10
3. Cut a stick using ruler X-04.
Put a stick. No Glue.

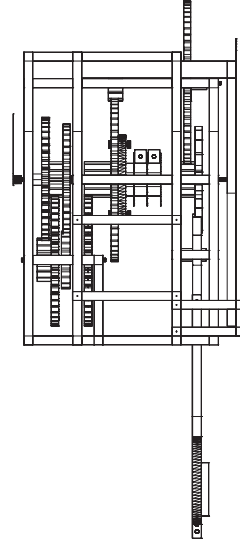
Completion

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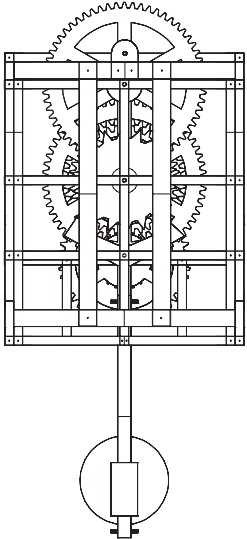
Elevational view



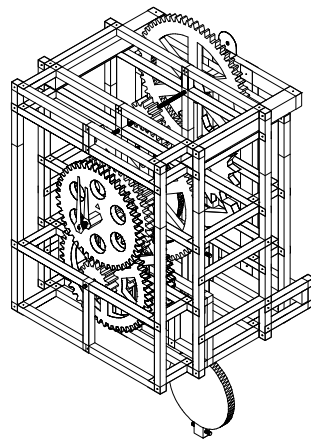
Side view



Rear elevation



Projection



Hang weight to one string and hang W-05 to another string.
Weight is about 160g.
I recommend putting water into a PET bottle and making it weight.
Weight is rolled by pulling W-05.
If W-05 is pulled strongly, a frame will break.
Therefore, support a frame single hand and pull W-05 slowly.

Since there is danger of fall when hanging a clock on a wall, be careful!!!

Put about 27g coin into a pendulum.

It goes and comes back to a pendulum in 1 second.
Regulation goes up and down the position of a pendulum.

Mail me, when there is a question.
Although my English will probably be unclear, I will answer as carefully as possible.

guru2_chronicle@yahoo.co.jp

I send the greatest eulogy and gratitude to you who completed the paper pendulum clock.
Thank you.

atom