Lego Serving Machine

Construction Using a Geared Motor

The original serving machine was built several years ago, using parts begged, borrowed or stolen from the children, so its design was dictated by what parts we had. Fortunately, the grandchildren are only interested in the normal Lego, not the Technic parts so far!
Since then it's had a number of revisions and it's probably about Mark IV by now!

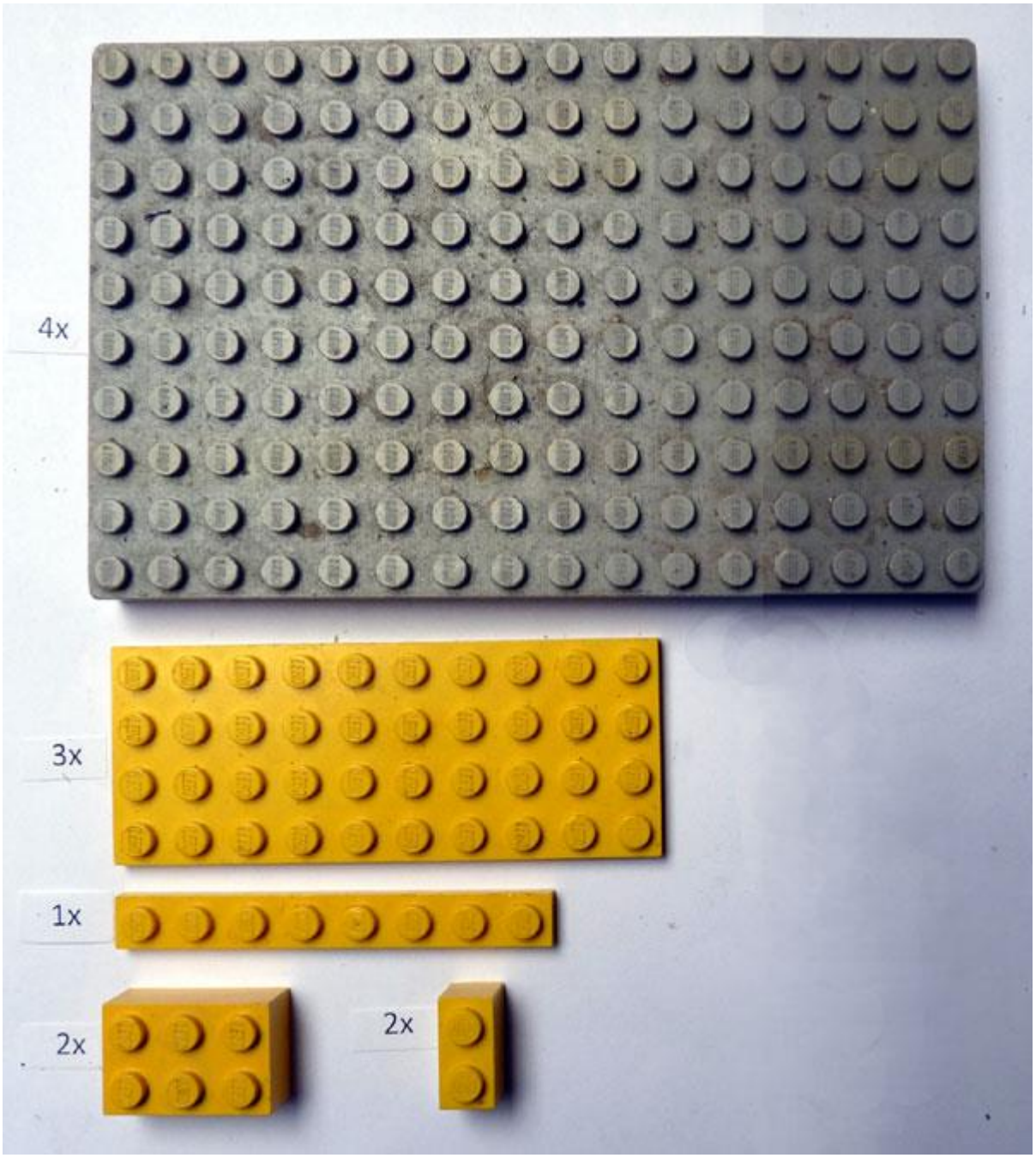
The revisions have probably all been related to the 'Steady' that supports the line at the point where it's being served. This needs to move along as serving progresses and the range of travel and the freedom of movement are the areas that have been improved.
In the latest version the shaft that the steady runs along is now a piece of wooden dowel the full length of the machine. This shaft now rotates. This, in effect, means the lateral friction between the shaft and the steady is virtually zero. The steady aligns itself with the point of serving.

All the previous versions had a shaft along the back to drive the remote end of the line being served. The front shaft, which carries the steady, now also drives the remote end and the rear shaft is no longer required.

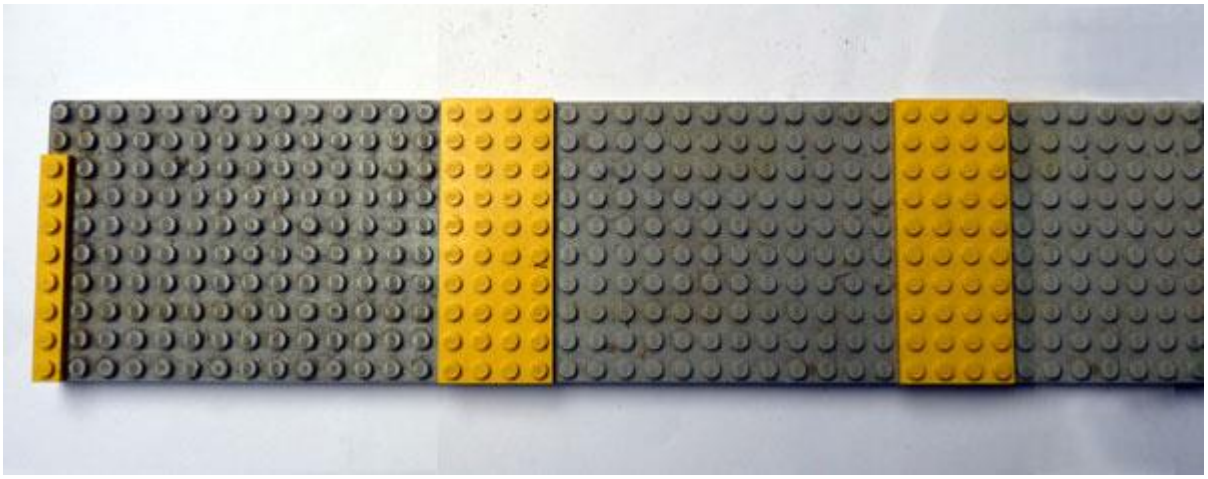
Click here to view a video showing the construction of the non-Lego parts (the wooden shaft and two cord anchorages).
Note: The video was recorded prior to construction of the latest version of the serving machine. Ignore the machine visible in the background, and any reference to the shaft at the back.

Step 1

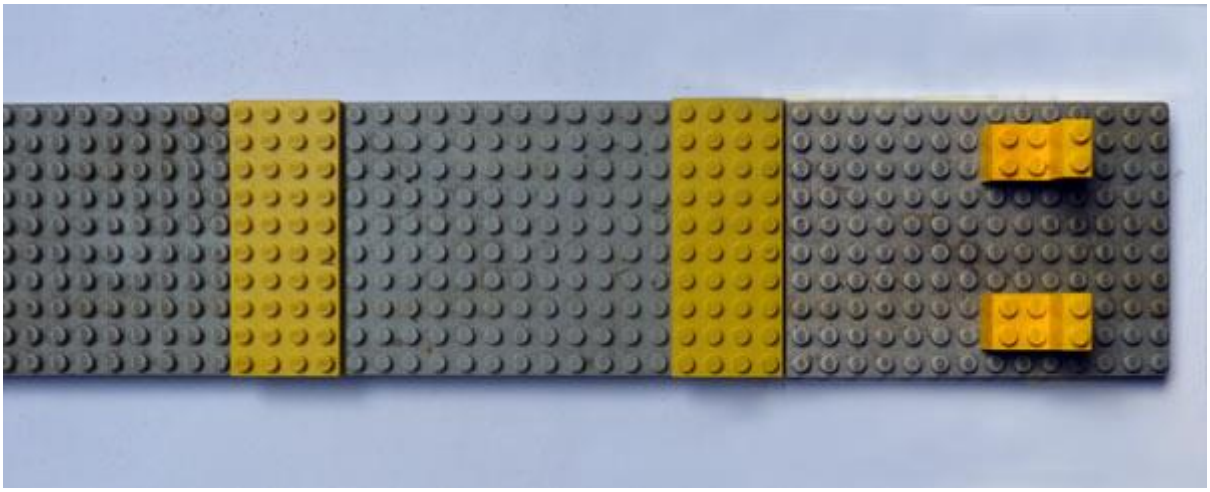
Parts:



Left hand side view of the base:



Right hand side view of the base:



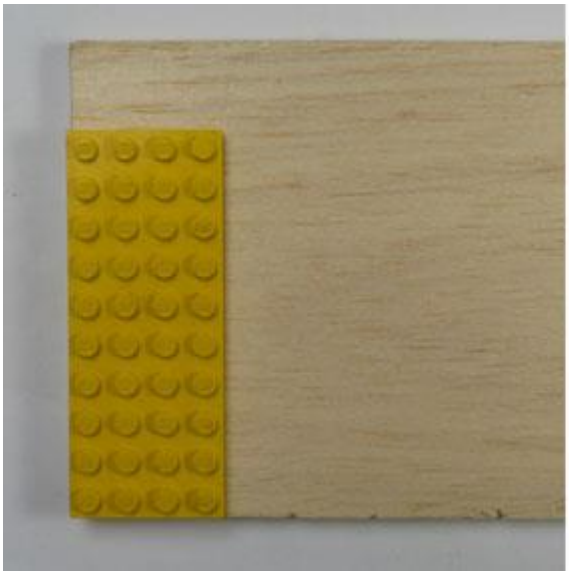
Notes:

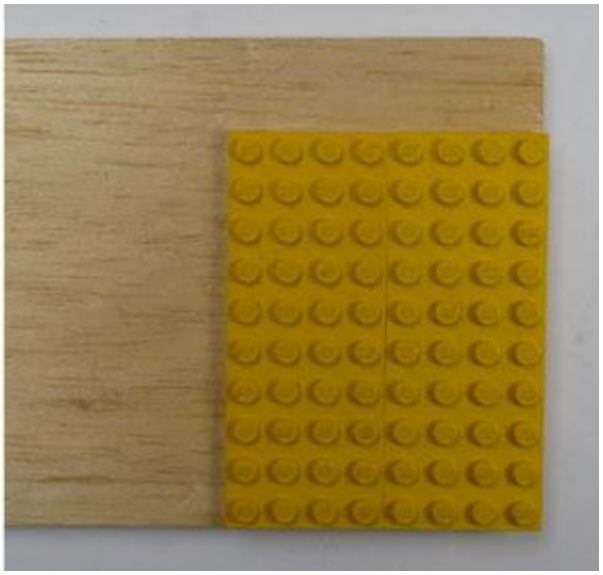
The length of the base is not critical. The original was built on three 10 x 20 bases. These bases don't now seem to be available so the construction shown uses four 10 x 16 base units, making the overall length 64 rather than 60. (The base length of Lego is 8mm so the overall length is just under half a metre).

Shopping around for other size bases can result in considerable savings. For example, although a 16 x 32 base is, on average, more expensive than a 10 x16, you can find them at less than £2 and you only need two for the same overall length.

A more significant saving, around 40% of the total cost, can be achieved by omitting the base plates entirely and using the 4 x 10 plates as the base.

The drive end requires a 7 x 10 area so it could be built on two of the 4 x 10 plates screwed or glued on a wooden base board. The other 4 x 10 plate is more than adequate for the left hand end.





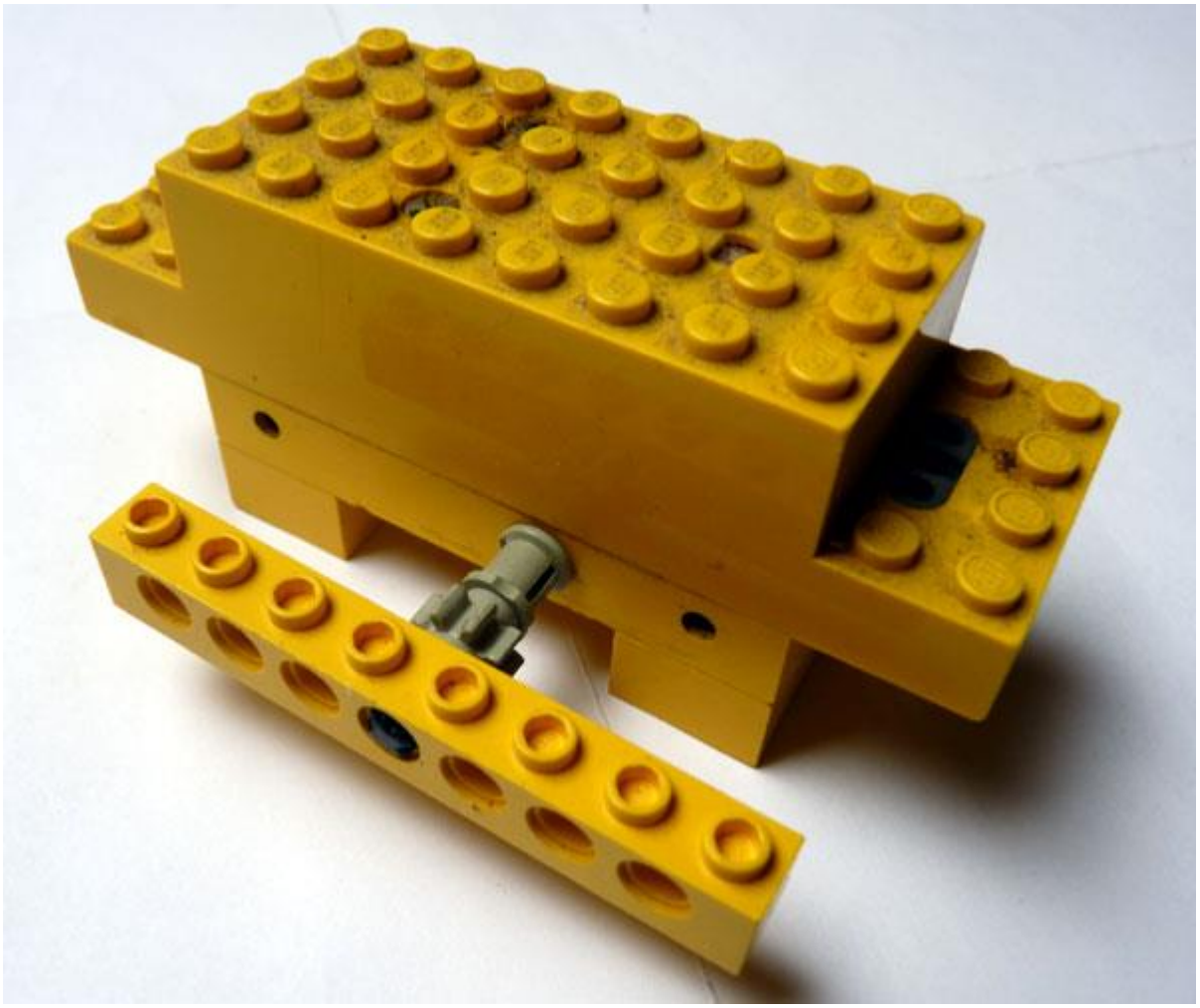
The length of the wooden base isn't critical, but around 500mm would be reasonable.
The length of dowel used in step 6 can be adjusted to match.

Position the 1 x 8 plate at the left and the two 2 x 3 + 1 x2 bricks at the right on these plates as shown in the previous pictures.

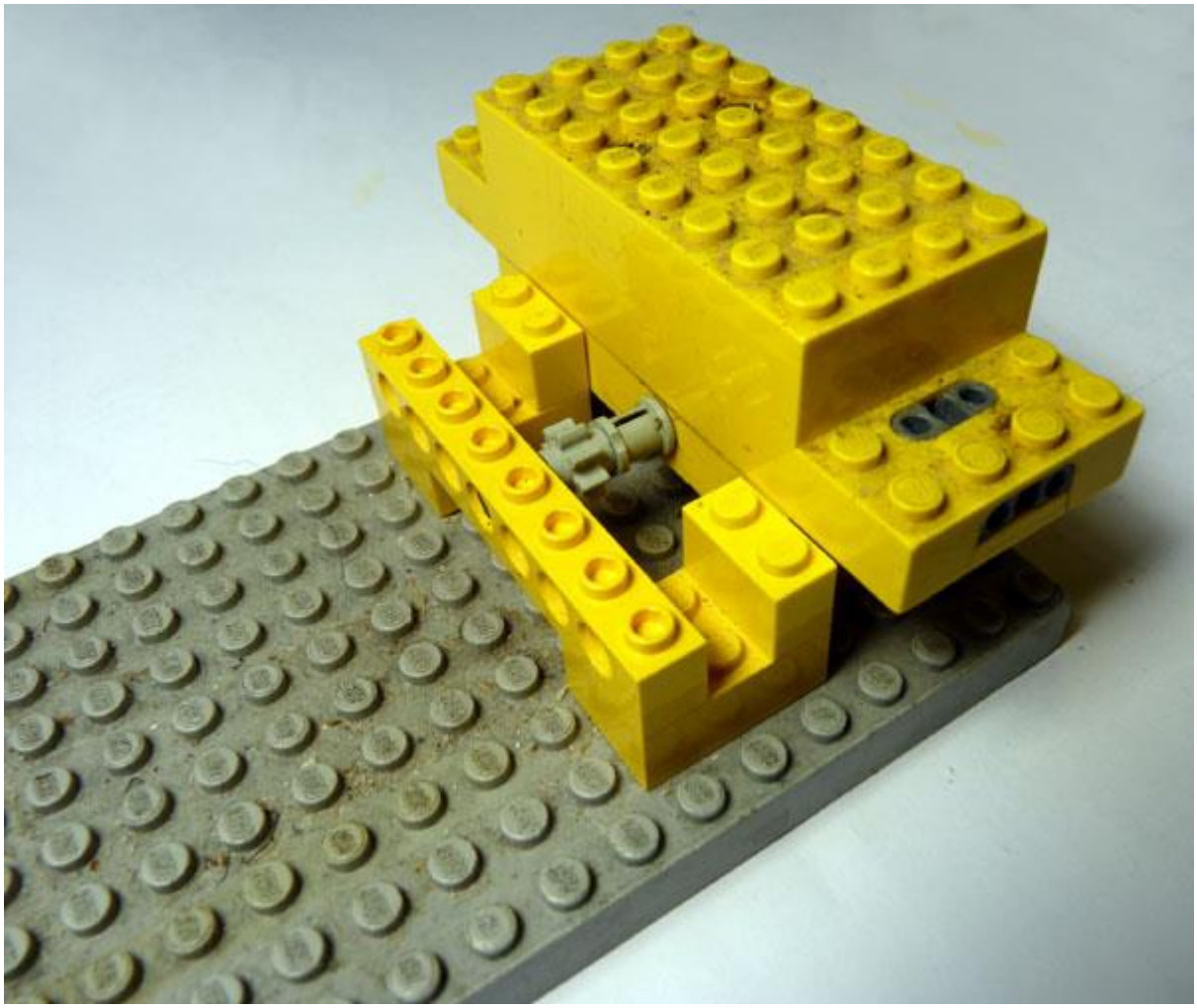
Step 2

Parts:

Sub-assembly:

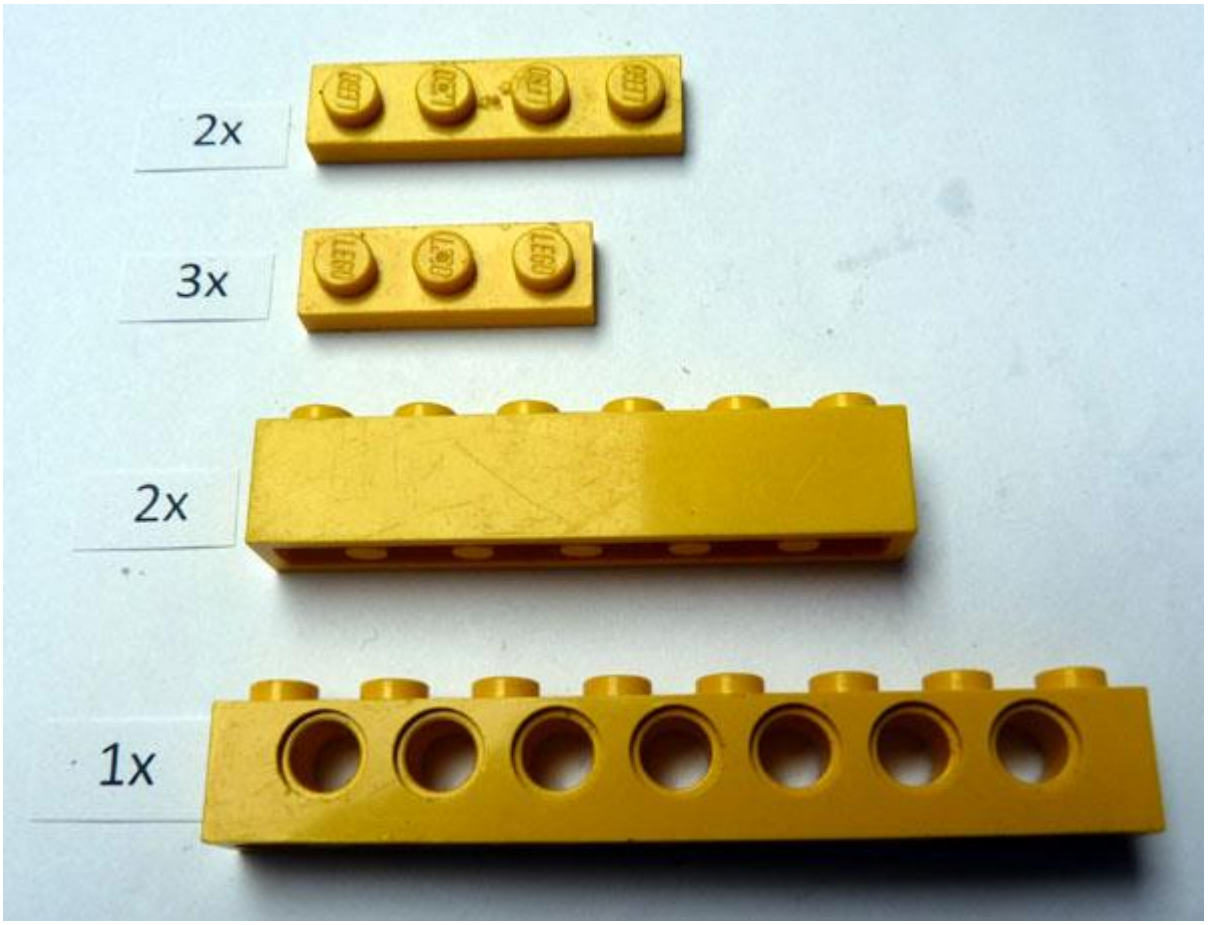


Assembly:

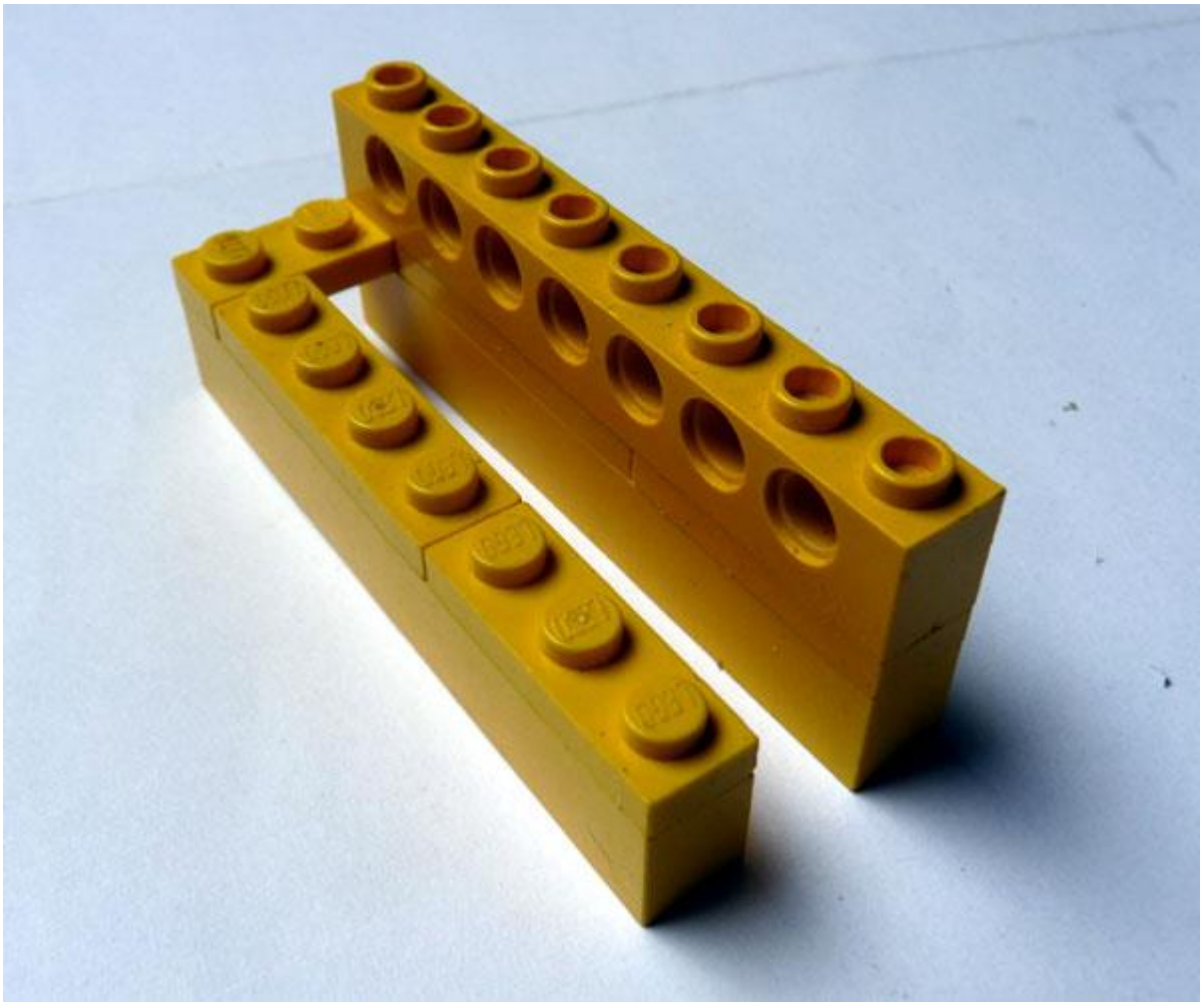


Step 3

Parts:



Sub-assembly:



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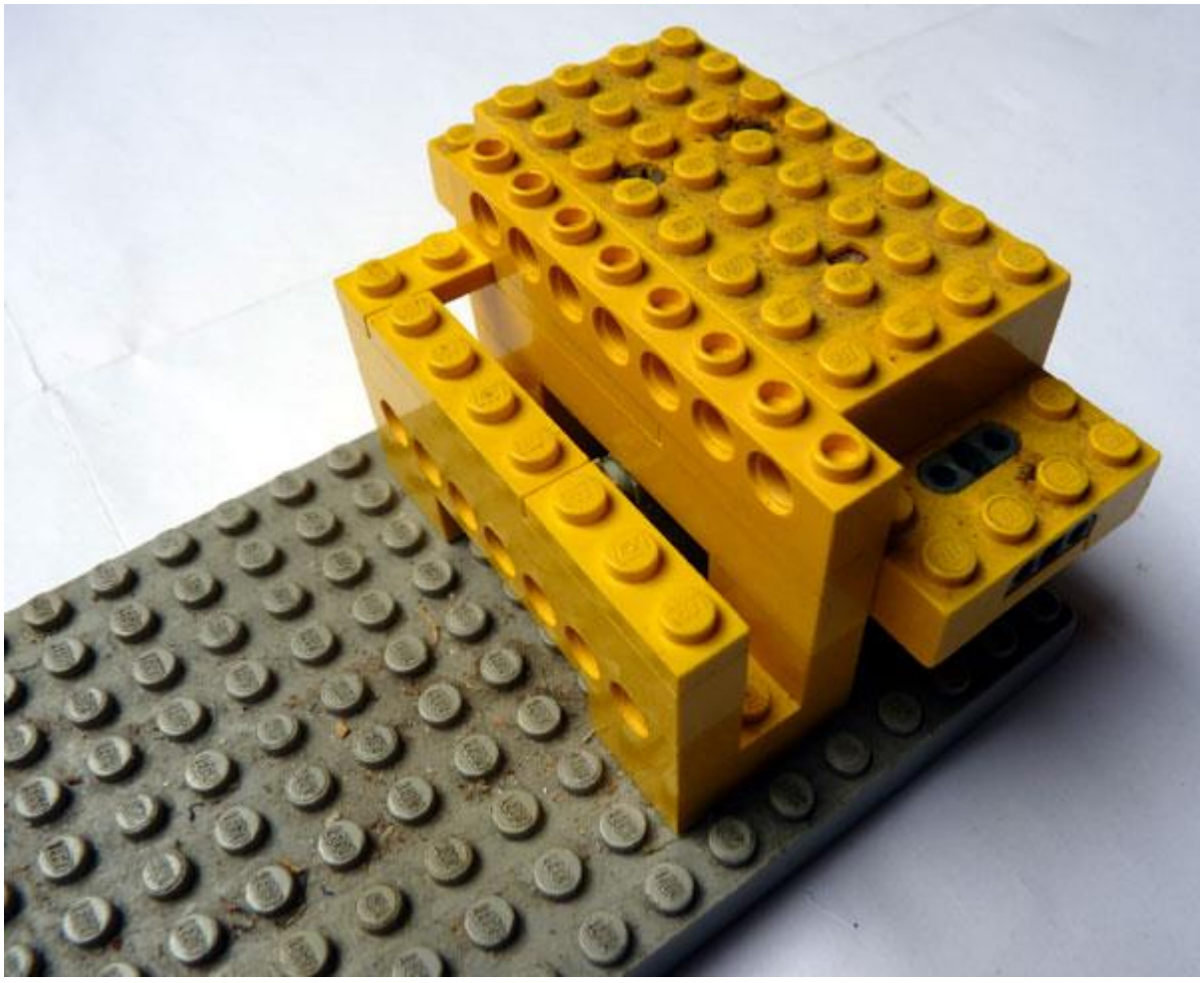
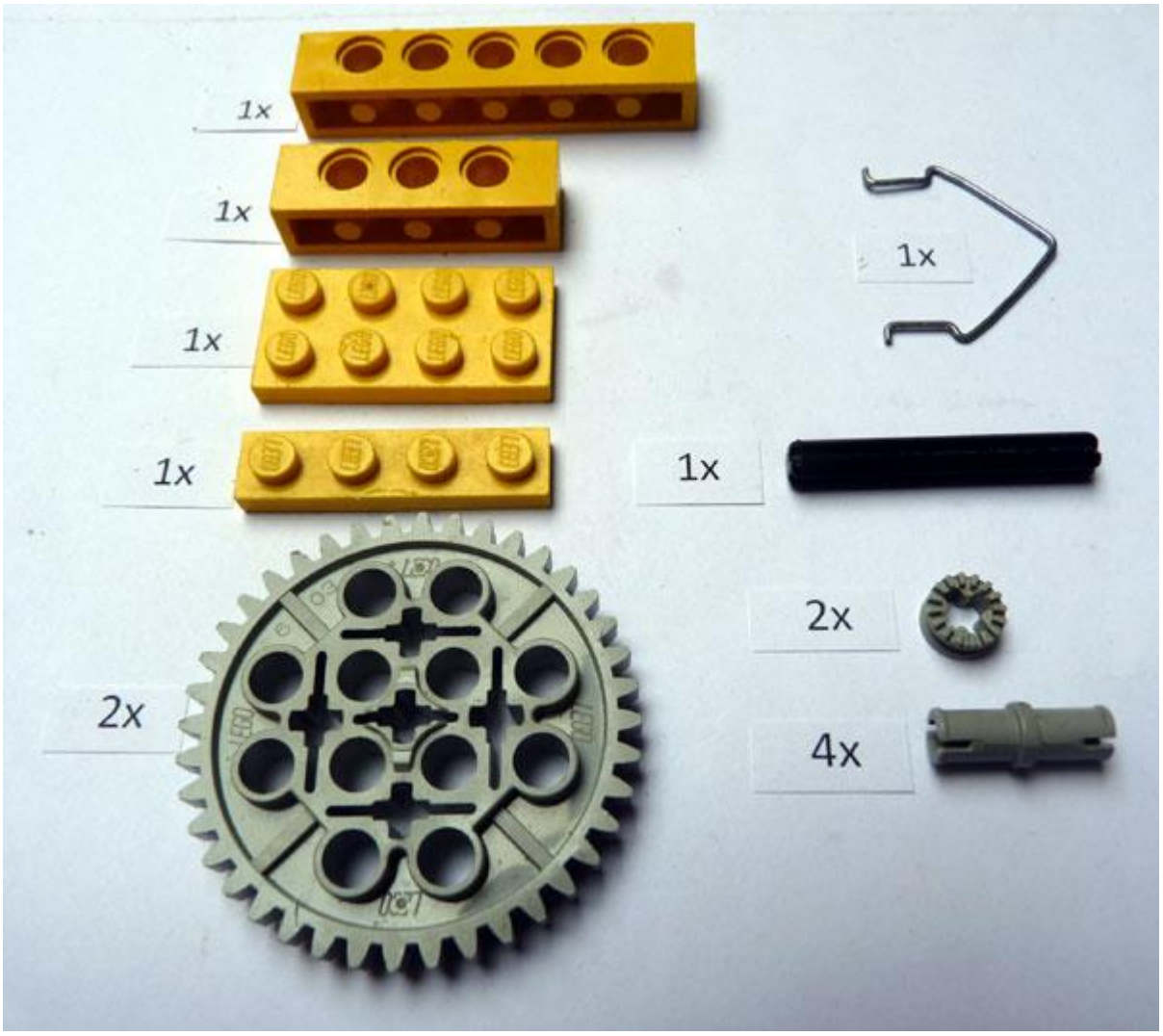


Step 4

Parts:



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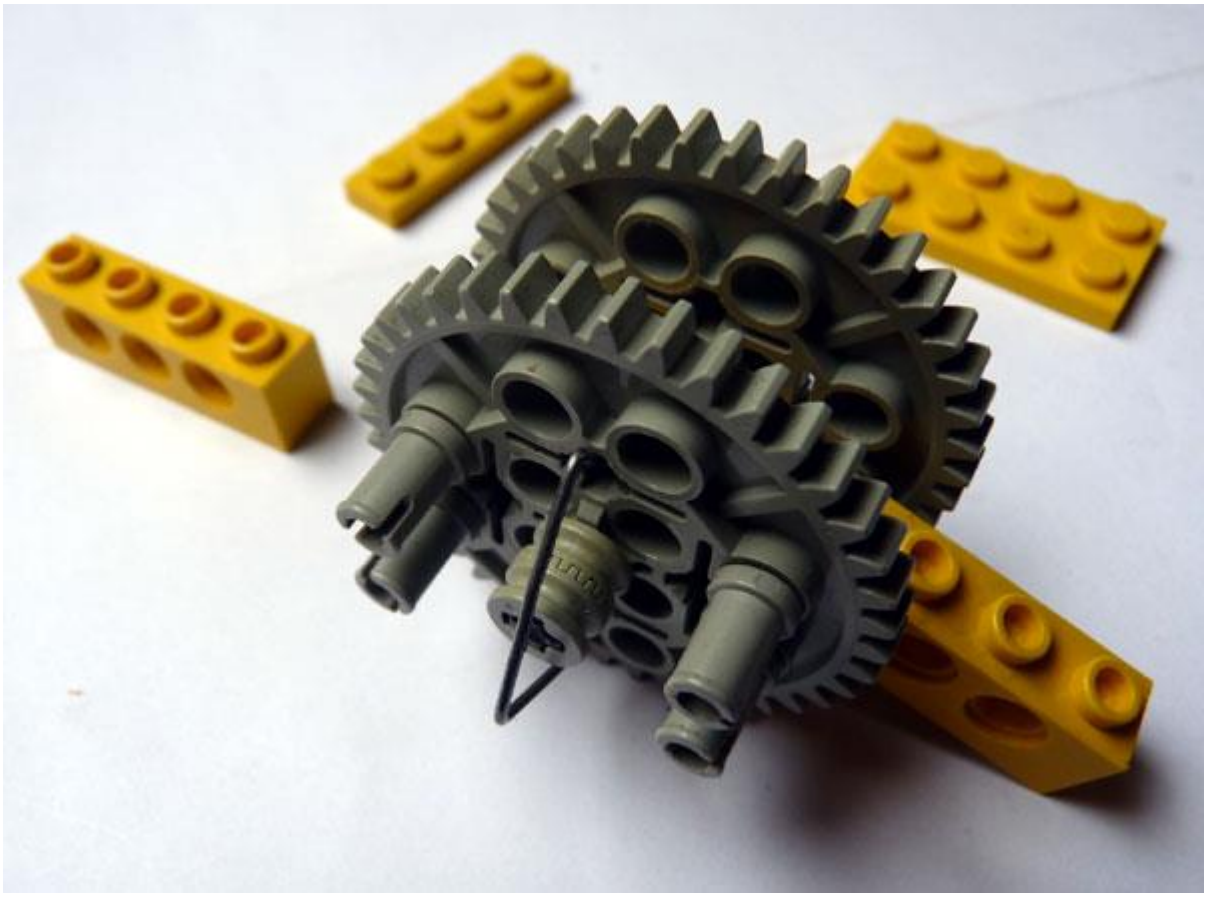

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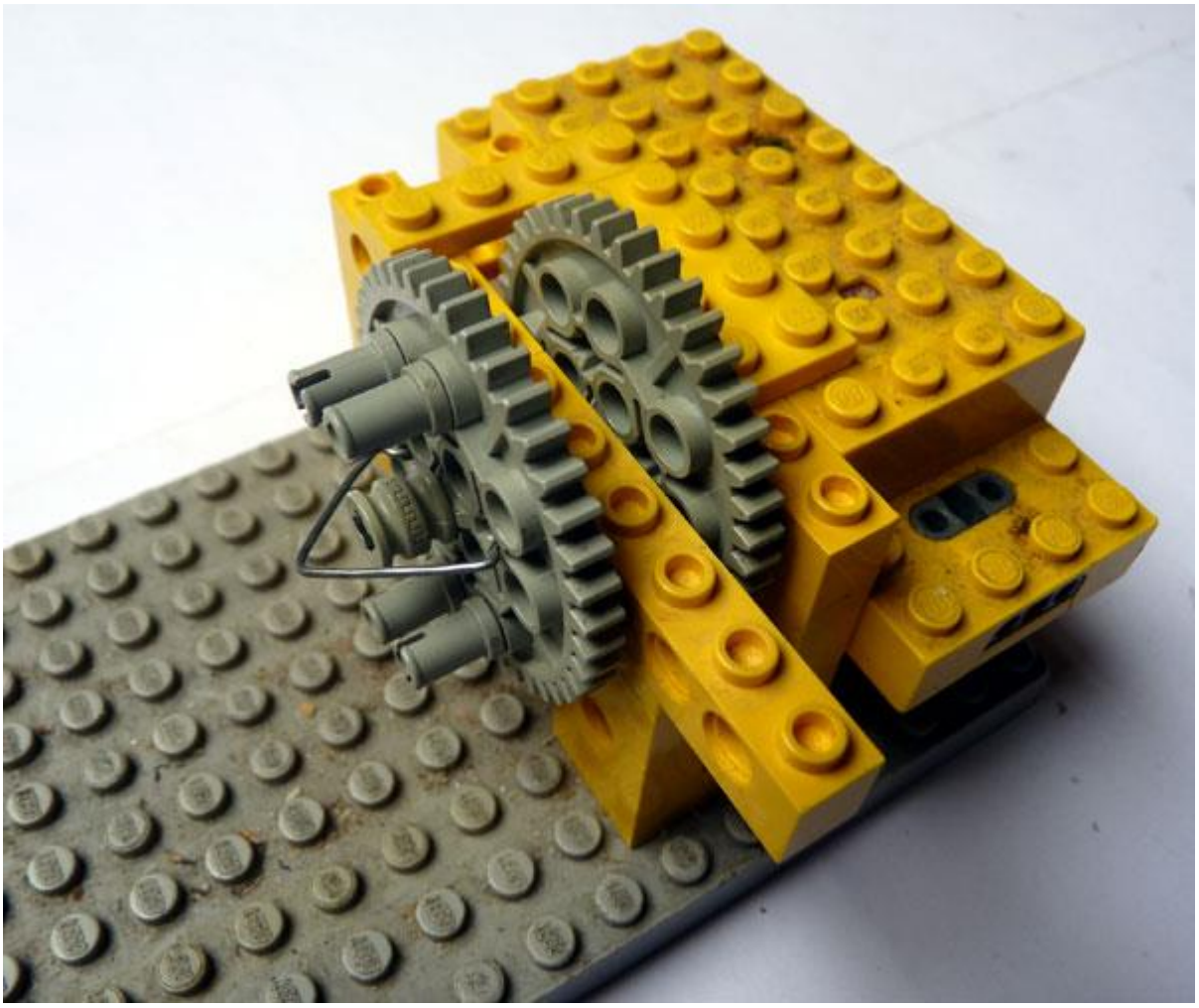
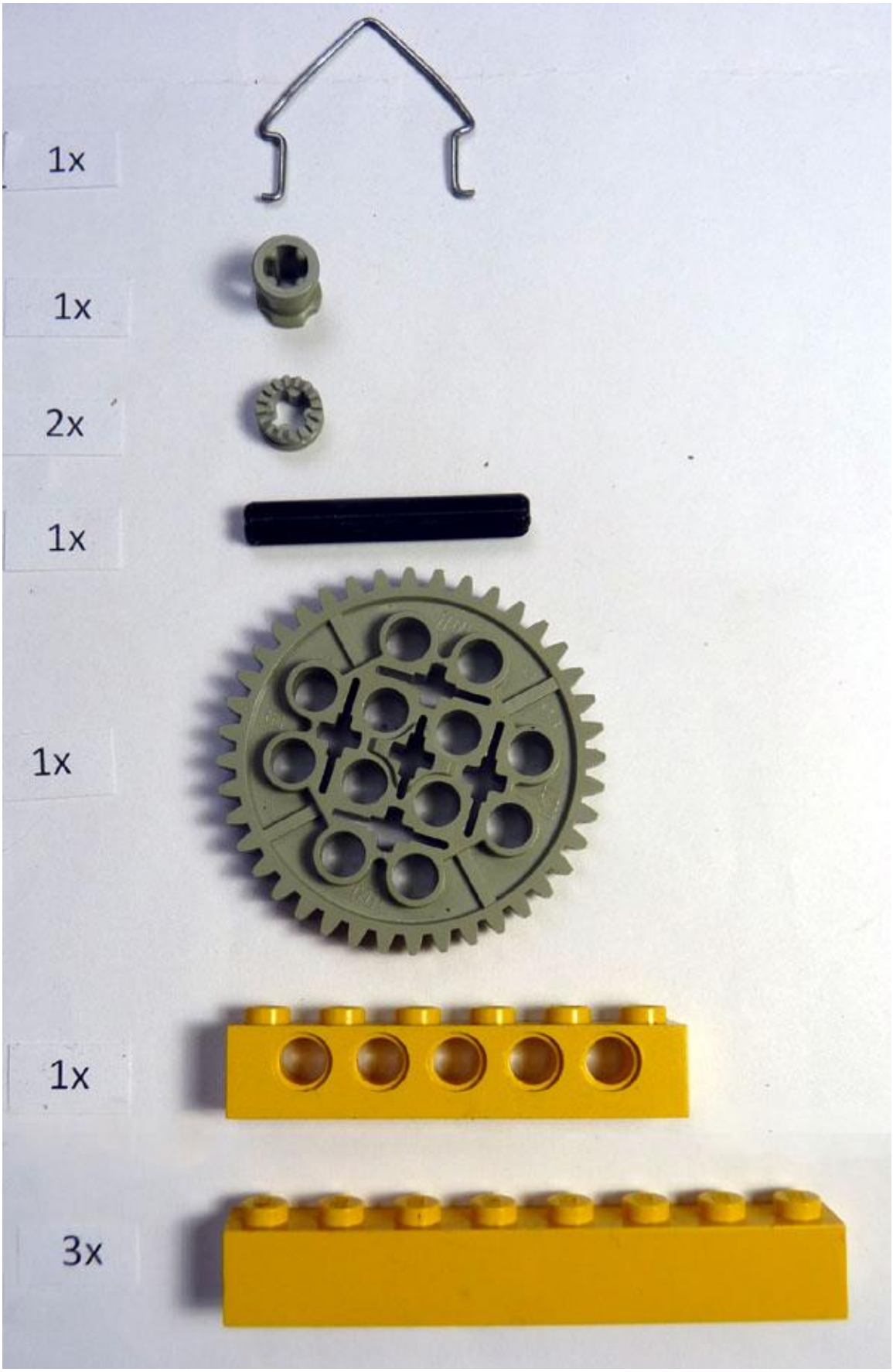


Step 5

Parts:



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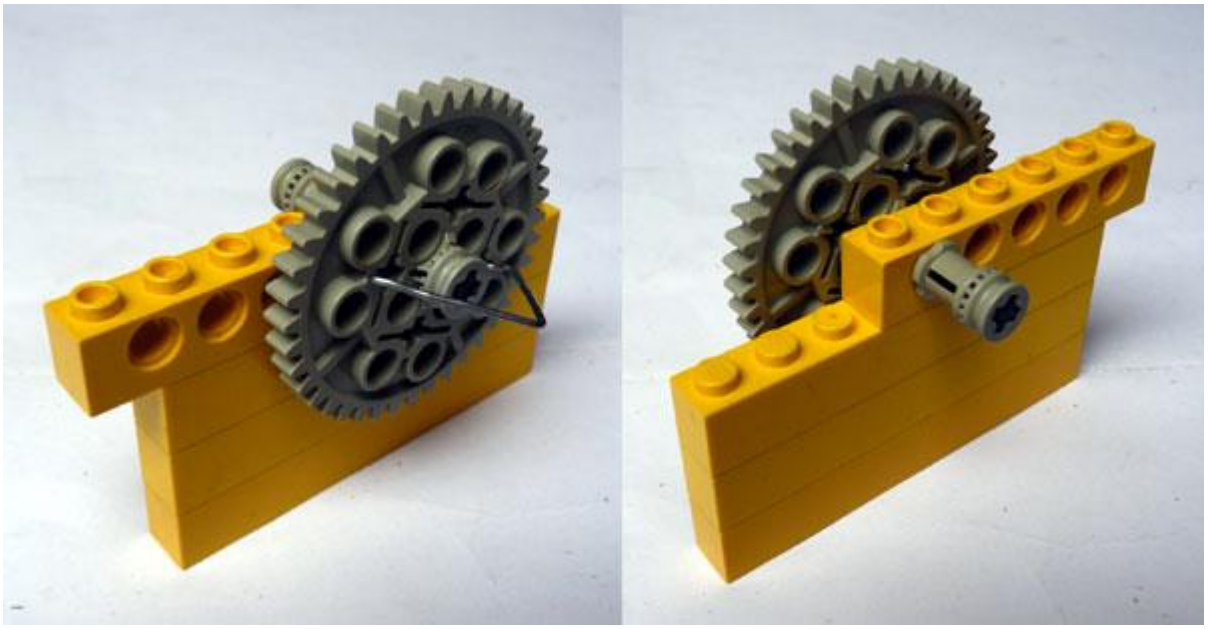
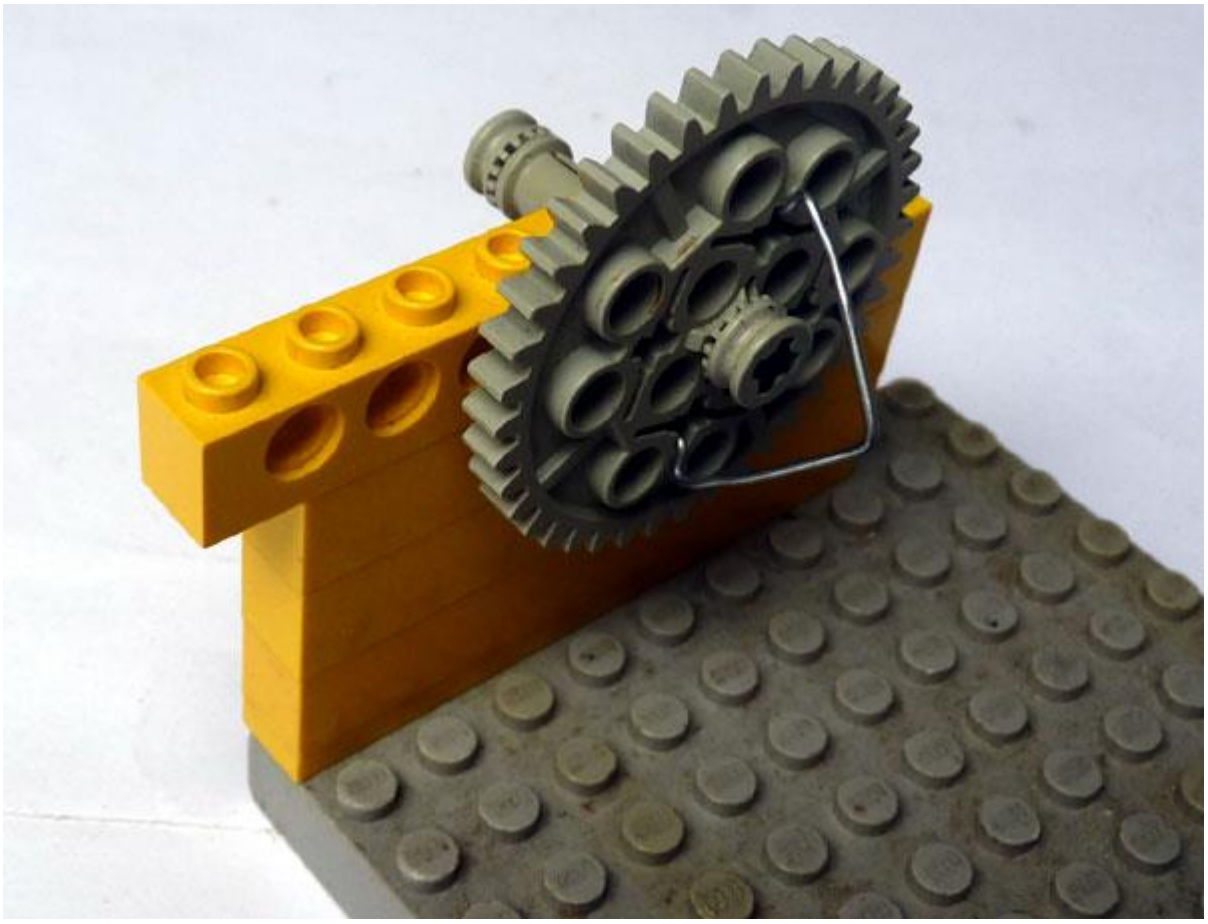
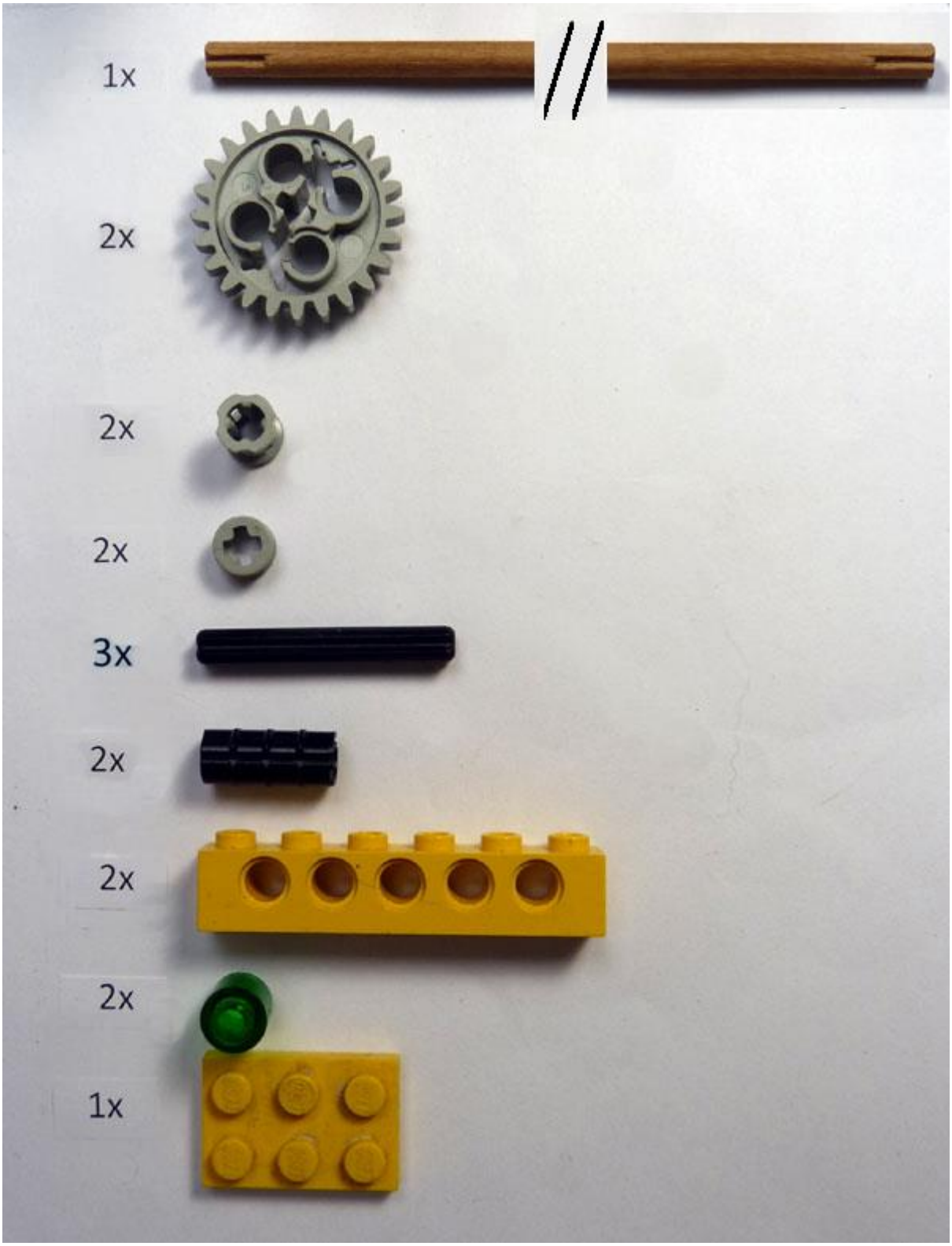


Assembly:



Step 6

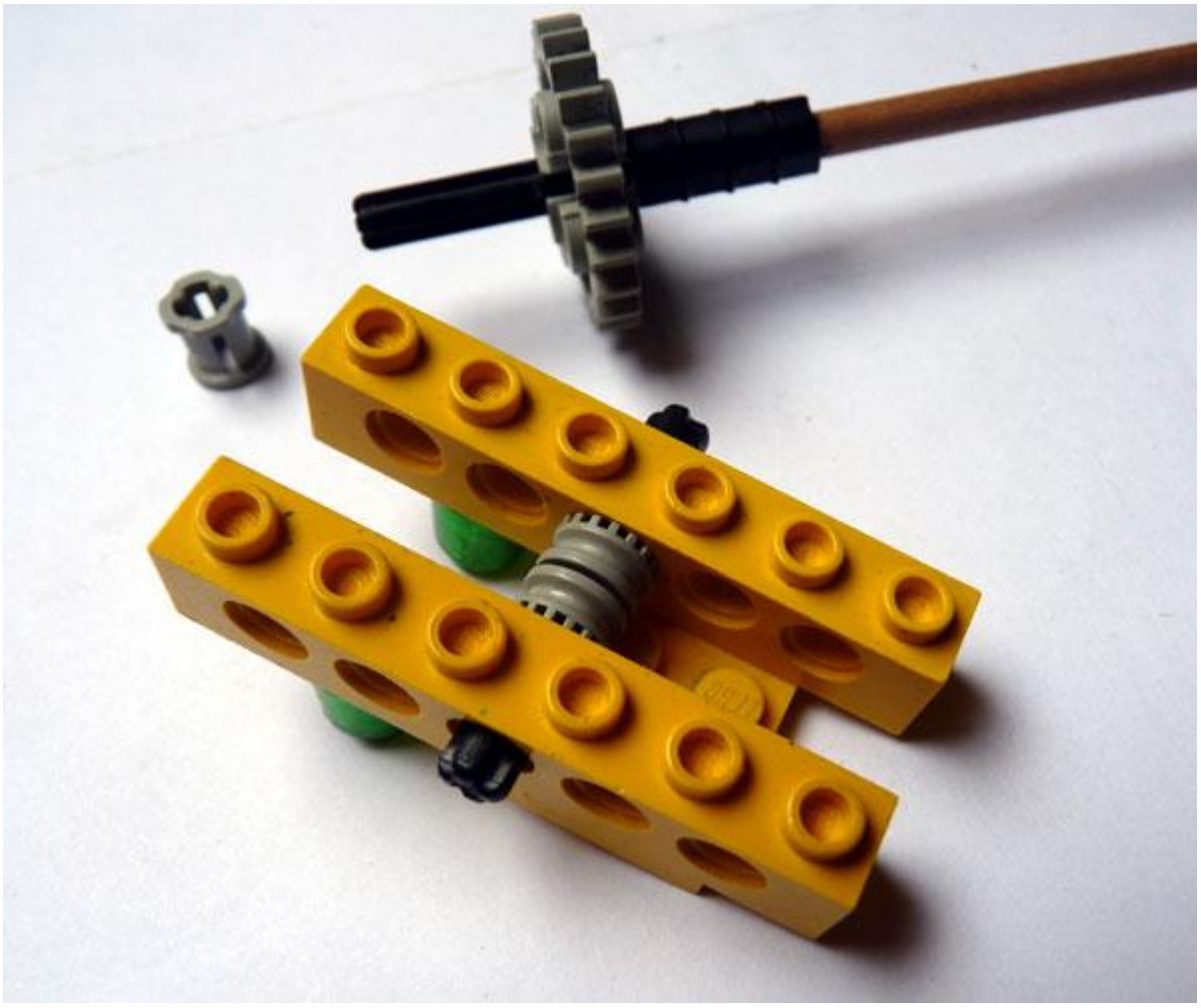
Parts:



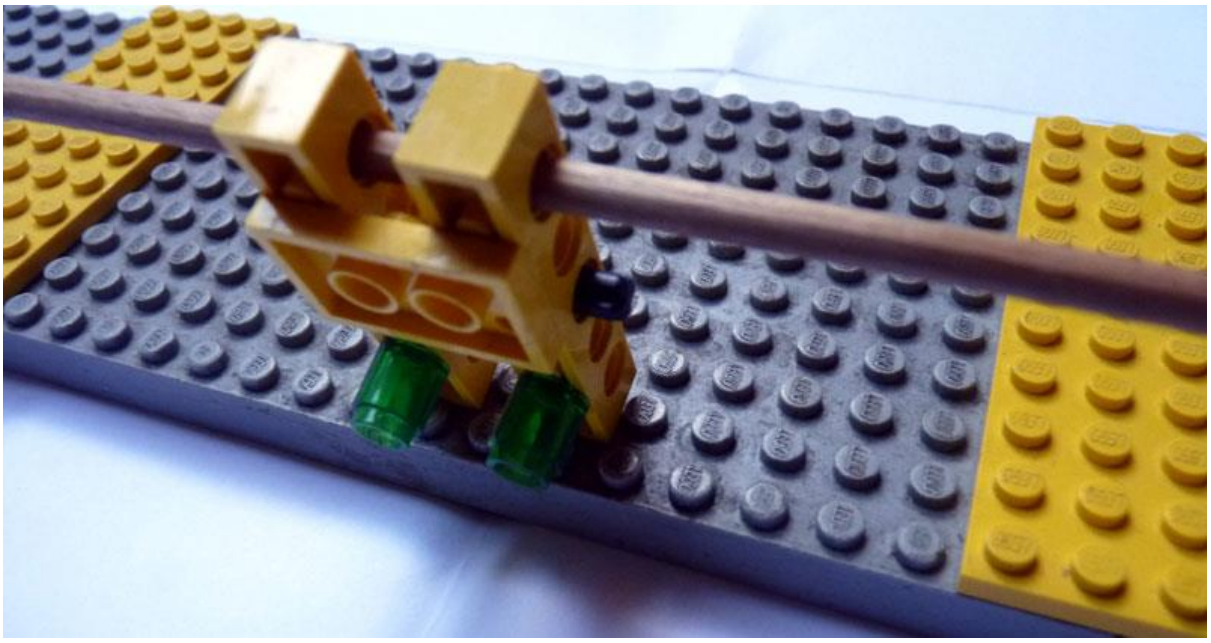
Lego comes in rather clever sizes. As you would expect from a Danish company, the parts are designed to metric sizes and are based on a unit length of 8mm. However, a basic 2 x 4 brick is actually made to an Imperial size! The brick is 1 1/4 inches long, 5/8 of an inch wide and 3/8 of an inch high. That's just under the 32mm x 16mm design dimensions to allow some tolerance when fitting the parts together.
The significance of this is that the diameter of the holes in Technics bricks is half the 3/8 inch brick height, i.e. 3/16 of an inch.
A search on the internet to find which countries still use the imperial system and hence will be able to purchase 3/16 dowel reveals that "only three backwaters still use the archaic Imperial system of weights and measures: Liberia, Myanmar and USA".
As dowel is meant to be a reasonably tight fit in a hole, it is possible that some slight sanding of the dowel may be required but a 3/16 inch drill bit is a free fit in a Lego Technics brick so this shouldn't be a problem.
Residents of other countries will have to use 4mm dowel; that's a loose fit in the Technics bricks, but works just fine!

The length of the dowel will depend on the bases used in Step 1.

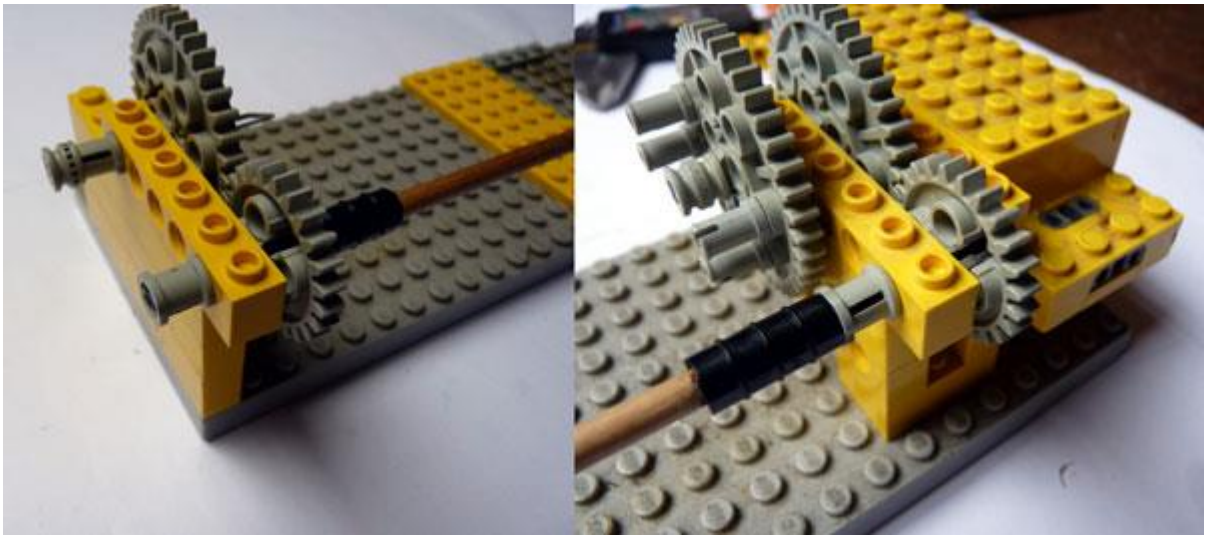
Sub-assembly:



Fit the steady on the dowel this way up:

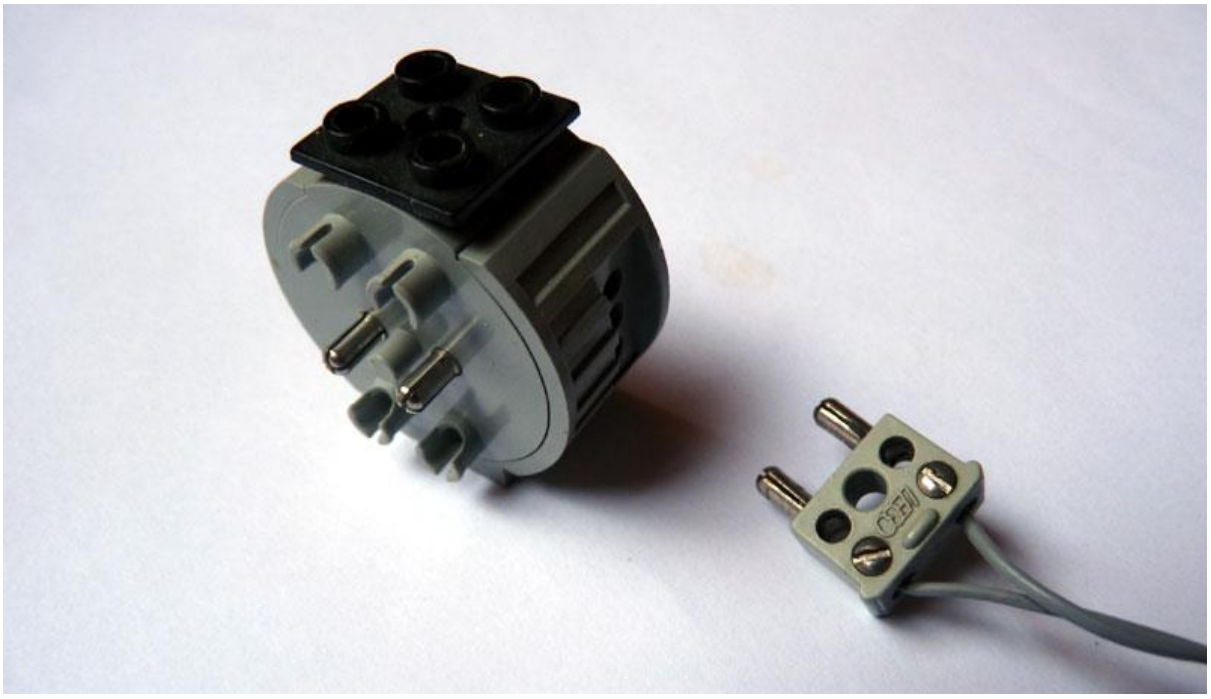


Assembly:



Temporarily lift off the Technics brick at the left-hand end in order to fit the shaft.

You will need a two pin plug to connect to the motor.
A reversing switch is optional, but highly recommended:



Note: The type of plug shown normally has a centre plastic pin; this has been cut off.
This type of plug can be stacked, so it also has a hole between the pins in case the plug you're stacking into it has such a pin.

The reversing switch can be plugged directly on to the end of either type of motor: