

Making an Animation Machine

Today's cinema began with simple machines developed in the nineteenth century. A prior module, the *Birth of Motion Pictures*, describes the way in which Muybridge used a series of cameras on the side of a racetrack to capture the motion of a horse as it galloped past.

In 1880 Muybridge used a mechanical movie machine to project the images during a presentation at the California School of Fine Arts (<https://iphf.org/inductees/eadward-muybridge/>). This was the earliest known motion picture exhibition. He later met with Thomas Edison, who went on to invent the kinetoscope, the forerunner of the motion picture projectors that gave birth to cinema and Hollywood.

Because the earliest versions of inventions are often simpler than the more refined versions that come later, they can serve as an entry point for exploration. This module provides a starting point for designing and making a mechanical movie machine similar to the one that Muybridge used.

The base of the movie machine is a box similar to the one constructed in the previous module.



The other three components consist of a spindle and bearing, a disk carrier, and a reflective cone.



A soda straw is used to form a spindle that supports the disk carrier. The bearing is obtained from a fidget spinner or a skate bearing.



Card stock is wrapped around the soda straw to make it thick enough to fit firmly into the center of the bearing. The spindle is then inserted into the bearing hub.

The assembled spindle and bearing assembly is then inserted into the mounting base. The spindle is first inserted into the hole in the center of the mounting base lid.



The lid is then placed on the mounting base shell. As the lid is placed on the mounting base shell, the spindle is inserted into the second hole in the mounting base insert. This stabilizes the spindle and ensures that it remains in a vertical position.

The disk carrier is used to support a rotating animation disk. It is formed by gluing three cardstock disks together to create a stiff platform that will support an animation disk.



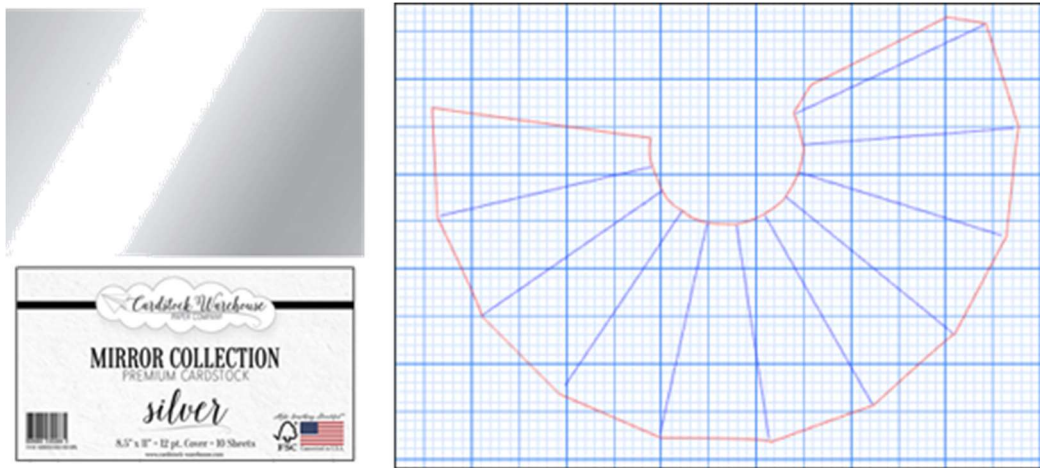
The disk carrier formed in this manner is then mounted on the bearing hub.



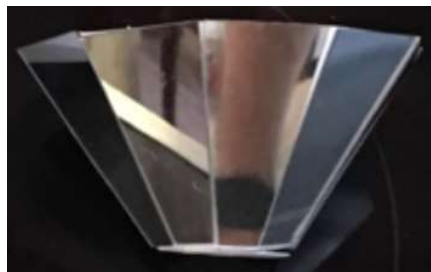
An animation disk can then be placed on the disk carrier.



Cardstock with a mirrored surface is used to form a cone using a pattern similar to the one shown below.



The mirrored cardstock is folded to create a reflective cone.



A paper washer placed at the base of the cone mounts onto the bearing hub to form the completed animation machine.



There are many variants on this basic design. For example, the components can be 3D-printed or laser cut rather than being formed from card stock. The addition of a microcontroller and motor makes it possible to precisely control the frame rate as the animation machine turns.