How To Animate Your Displays - Section I

The basic requirement for animation is of course, a motor, in fact several motors. When we talk of motors, however, we are not talking about the regular constant high-speed motors used to run other appliances. Most motors of the 1/4 horsepower groups have an R.P.M. of 1750. This means that the drive shaft makes 1,750 complete Revolutions Per Minute. This is much too fast for the purposes of animating a display, and 1/1+ H.P. is far more power than we need. Even the small so called fractional horse power‘ motors of 1/10 or 1/60 H.P, may give us more power than we need, but more important the R.P.M. of these motors will range from 3450 to 10,000 - much, much too fast. Of course, using special gear reduction boxes can reduce these speeds, but these are very expensive and you may find it difficult to get down to the speed that you want even with these.

Well, so far you know what you don’t want - but what do you want? To animate one act, and it is best to use one motor for each act for reasons which I‘ll explain in a moment, you will need a motor of about 1/150 H.P. and an R.P.M, of from 6 to 12. There will be very few things that will go faster than 12 R.P.M, but you will find an occasional use for an R.P.M. of 2 or 3. If you start to time motions you will find that things move a lot slower than you think they do. For instance, a bareback horse moving at a standard slow gallop will go around a 42-foot ring in about 9 or 10 seconds or at a rate of 7 or 6 R.P.M. A swinging trapeze of average size will make one complete back and forth swing in about 5 seconds or at a rate of 12 R.P.M. It should be born in mind that the longer the ropes of the trapeze the longer it would take to complete a cycle. If it should be necessary to make a choice of one speed take a motor of 6 to 8 R.P.M. While it does not always work too well, you can through the use of belts and pulleys vary the speed of such a motor and you are starting with a good all around basic speed.

Now why do we want one motor for each Act? There are several reasons for this. First, mechanisms of the home made variety that most of us will be building do not always work as well as they might. Of course, if you are an accomplished machinist this reason may not apply. So if all your animation operates off of one motor and one act jams or otherwise must be stopped or disconnected it is not necessary to stop all the acts. Second, with a separate motor for each act we can get some variety of speed into the scene. In a display of several acts all driven from the same motor you cannot avoid the same BEAT to all the acts. By that I mean that even though you have, through gearing, gotten one act going twice as fast as the first and another three times as fast as the first, the relation of two to one and three to one will remain constant. This gives a very artificial appearance to the display. Separate motors for each act get away from this feeling of BEAT end greatly enhance the appearance of realism. Third, it is easier to work out the mechanics of placement with individual motors. By that we mean that you put the motor where the act is. We do not have to worry about putting the act over the drive shaft or otherwise working out some intricate drive arrangement. Fourth, the cost of several small motors will be less than one larger motor plus all the shafts, pulleys, belts, gears and so forth that you will need if you use only one motor. These latter, can as a matter of fact run you much more than the cost of the motor itself.

So, now we know several things. We are going to use one motor for each act. It will be only about 1/150 H.P. or less and it will operate at speeds of somewhere between 6 and 12 R.P.M. Essentially this is a clock motor except that it goes slightly faster. Actually it is generally known as a display motor for it is most commonly built to operate the small animated window displays that we frequently see in store windows, New they cost $7 to $9. But who wants a new one. Used they can be bought in the neighborhood of from $2 to $3 - a more reasonable price and, if you can cultivate the right kind of friends you might even get some for a buck apiece. Do not get the idea from what we have said that they are easy to get. They aren’t. To get leads you should write or call the nearest company listed in the yellow pages under the heading “Advertisement Displays.” Tell him what you want and why and ask his help. A few letters or calls should get results. Good luck!

With this much you are on your way. But we know that you will want your people to do more than walk around in circles. They should do all sorts of things - move back and forth, in and out, up and down and round about.

How To Animate Your Displays - Section II

This section will be devoted to describing the basic motions. In another we will describe some variations to add more novelty to show.

To start with, your motor, which incidentally is also called a timing motor, can be mounted under your table in two positions, either horizontally (see A.) or vertically (see B).

The horizontal (A) position will always be used for rotating motions while for oscillating motions, that is up and down or back and forth and their variations either the vertical or the horizontal positions may be used, depending on

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the application or your personal preference based on your own experimentation. The horizontal position (A) has the advantage of permitting somewhat simpler drive mechanisms but is awkward to work with and to get at to make adjustments, of which you will probably have plenty. The vertical position (B) requires somewhat more complicated drive mechanisms but is easier to work with once it is installed. So try both ways and select the one you like best. Incidentally because of motor and other differences we will give no dimensions in our plans. These will have to be worked out by each of you to fit your individual materials. All we can do is to give you the general idea.

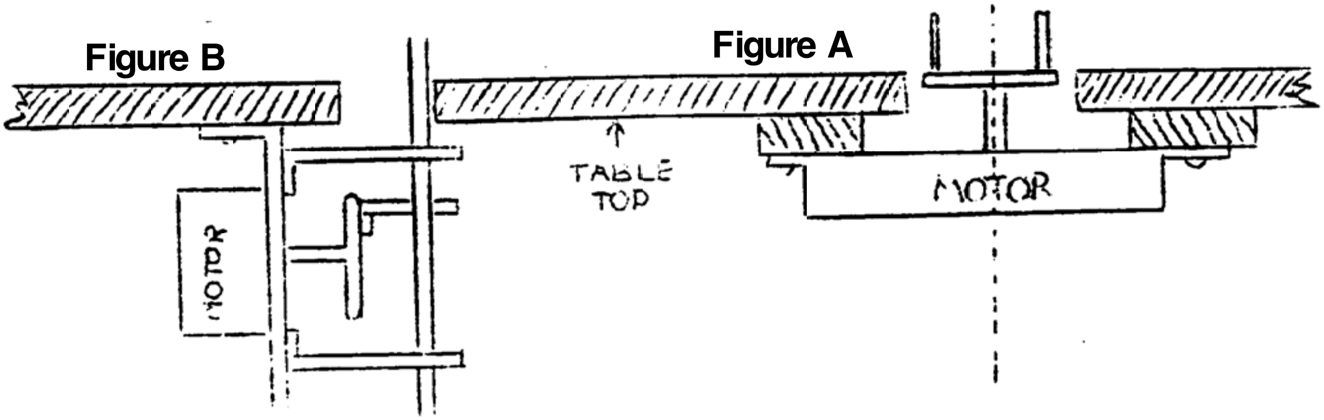


Figure B

Figure A

To make a circular motion you should mount your motor horizontally as In (A). But before mounting your motor you should attach a drive arm to the motor shaft. For this there are two methods. You will find that the motor shaft will be threaded on the end. This will allow you to screw a drive arm onto the shaft. The first kind of drive arm is a flat metal plate as shown in drawing (C).

This plate will have a hole in it at location 1 and two pins at locations 2 and 3. No. 15 galvanized wire is a good size for this. The pins should be flattened slightly at location 4, by tapping on a small anvil with a small hammer and then soldered to the plate. The hole 1 fits over the motor shaft and is held in place by two nuts, one above and one below. Depending on the direction the shaft turns the threads on the shaft may be right handed or left handed, so in getting the nuts be sure you get ones with the proper threads. The pins 2 and 3 will fit into holes in the base or the feet of the model to which you wish to impart a circular motion.

A second plan for making the drive arm is to cut a slice of dowel, about 5/8" or 3/4" are good sizes, as in (D).

The only difference between this and the metal plate is that no metal and soldering work is required. The holes for the pins 2 and 3 are drilled the same size as the pins or slightly smaller so you have a real tight fit. The motor shaft hole (1) should be drilled the same diameter as the inside diameter of the thread on the shaft, see (E). With this done you may now screw the plate onto the motor shaft,

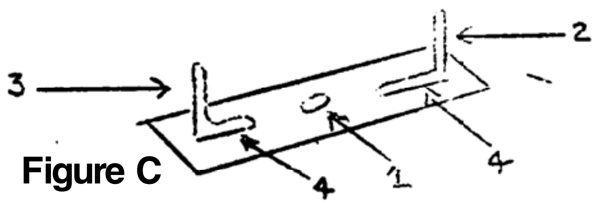


Figure C

You are now ready to mount your motor as in (A) and start your first animated figures - perhaps two horses running around the ring as in this manner, looking down on them from above.

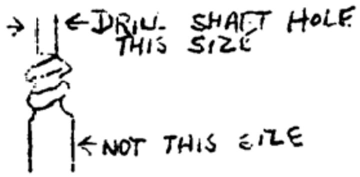
Notice that the center of the stand, where the two drive pins come through is large enough to cover the hole in the table at all times. To keep the illusion of reality it is always wise to keep as few of the moving parts or mechanism above the table as possible. Do not have the whole inside of the ring move for instance.

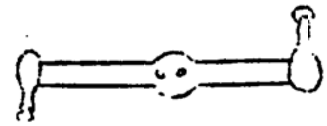
Having now built a rotating mechanism we will now build one that can make people jump up and down or animals rear or perform any other movements that are essentially up and down. The method of attaching your motor to the table is shown in the series of drawings (F), (G), (H) and (I) on this page.

Figure D

Figure I in the above drawings is the motor mounting plate that holds the motor, and the animating mechanism to the table. It can be made out of any medium gauge sheet metal. Tin cans out of your wife‘s garbage can (not the kitchen closet) will furnish you with plenty of good sheet metal for this purpose. Referring to (I) you will see that item 1 is bent at right angles. After it is bent five holes are drilled, two at 2 to take the screws that will hold it to the table, one on the line of 5 to take the motor shaft and two on the line of 3, which serve the double purpose of bolting the motor and the oscillating shaft plates to the mounting plate 1. As you will see later the oscillating plates must be in a straight line vertically with the motor shaft so it may be necessary to have another set of holes if the bolt holes

Figure E





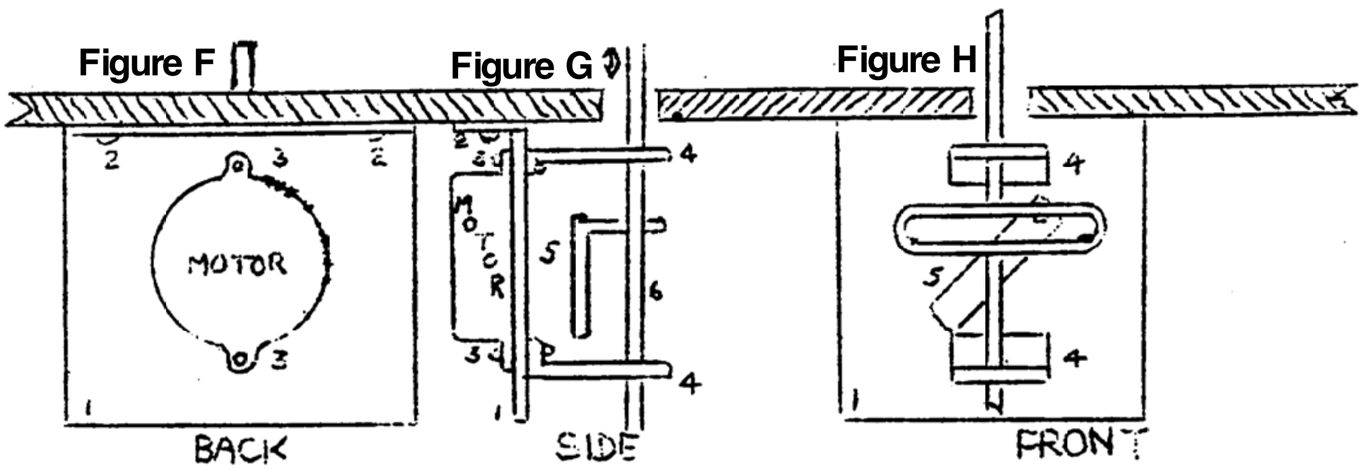
HORSES FORM ABOVE

on the motor do not permit this alignment.

The oscillating shaft plates 4 are designed to hold the oscillating’ shaft 6, They are bent at right angles and each contains two holes, one on the line 3 to bolt it to the mounting plate, and the other to hold the oscillating shaft 6 These latter holes should be only a shade larger than the diameter of the oscillating shaft 6 itself, and in a straight line with the motor shaft.

The drive arm 5 for an oscillating motion is the same as that used for the rotating motion except that it has only one pin instead of two. At this point we should point out that the diameter of the circle described by this pin in its

Figure F **Figure G** **Figure H**



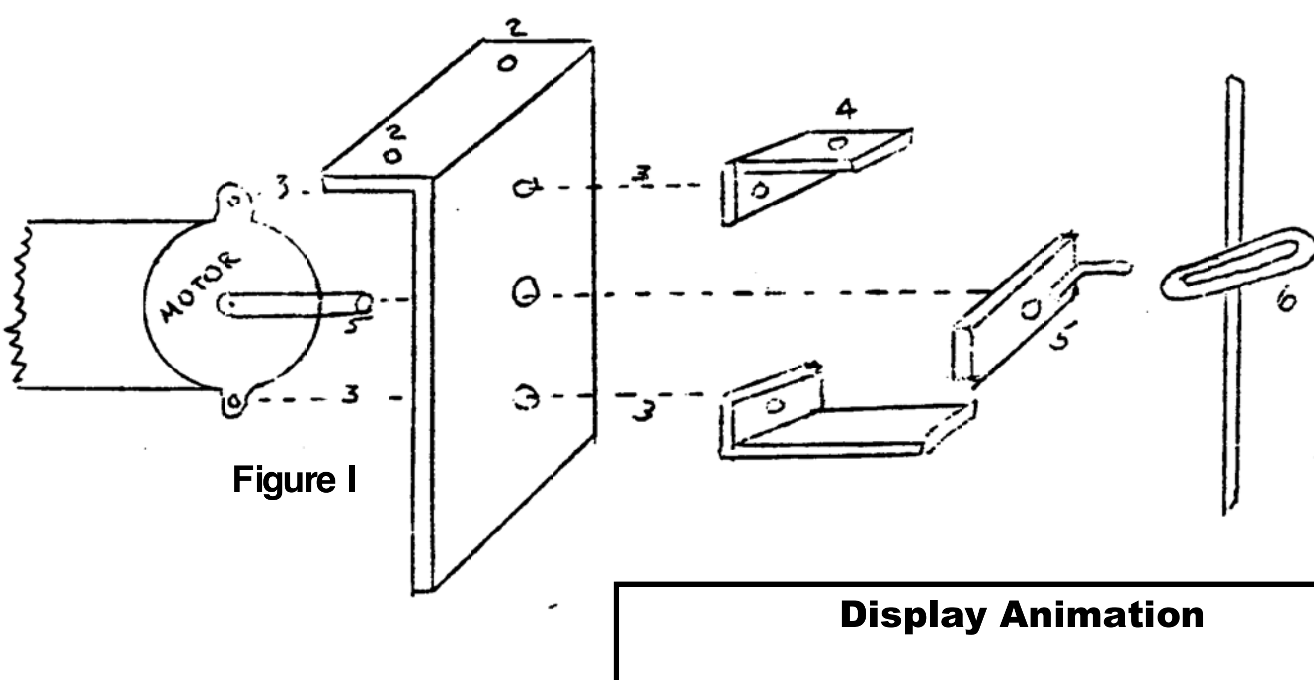


Figure I

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rotation determines the extent of the up and down motion imparted to the model. The greater the circle of rotation the greater the movement. If we want a model to jump one inch into the air the pin must describe a one-inch circle and therefore must be set 1/2" off the motor shaft.

Now finally we come to the oscillating shaft 6 - that part of the whole mechanism that imparts the motion to the model. As you see from the drawings it is a very flat "O" with an arm top and bottom. This should be made out of fairly heavy 18 or 16 gauge galvanized wire. You will want to solder it together. It should be smooth without dents or bumps along its inside, the inside should be only a little wider than the drive arm pin which fits into it and must slide freely within it. The arms must be long enough to stay within the guide holes of the oscillating plates 4 at the end of each thrust. And the top arm must be long enough to project through the table and be attached to your model in whatever way is necessary to animate it.

You are now in a position to make your models go up and down and around, there remains only one other motion to describe and that is lateral motion (back and forth or side to side). This is merely a variation on the up and down motion and can be installed in almost the same way, Essentially all that is necessary is to turn the mechanism over on its side, However, two slight differences must be noted. The oscillating shaft gets another arm and the hole in the table through which it projects becomes a slot to permit the lateral movement. The drawing (J) will show the basic differences and when compared to the other drawings should make further explanations unnecessary.

How To Animate Your Displays - Section III

The drawings shown in this the final section are simplified, but no difficulty should be encountered if reference is made to the last section.

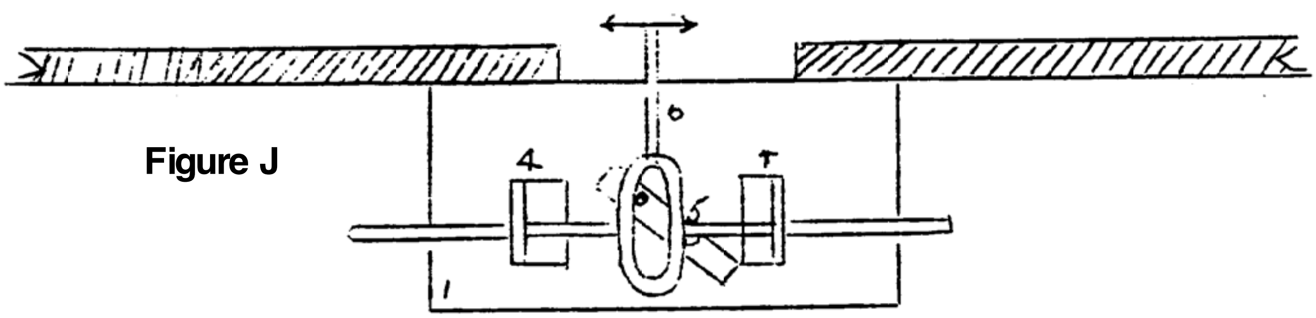
Drawings Al and A2 show the method of getting a regular up and down motion faster than the motor is turning. The number 1 in these and all subsequent drawings represents the motor plate. The number 2 in these and all subsequent drawings represent the drive arm, which is attached to the motor shaft. In drawings Al and A2, the number of bumps and hollows in the drive arm will determine the number of up and down motions.

Whether the up and down motion is regular or irregular is also determined by the nature of or shape of the drive arm. The deeper the hollow, the greater the movement. If the bumps and hollows are irregular then the motion will be irregular. Samples of this are shown in A3 and A4. In A3 if the oscillating arm 6 is to the left of the drive arm A3 as shown in A2 then the oscillating arm 6 will go up slowly and drop suddenly. This can be used effectively to animate a stake driver. If on the other hand the oscillating arm 6 is to the right of the drive arm 2 as in Al then you will have a slow downward and a sudden upward movement. If you use A4 as a drive arm you will get an irregular up and down which might be effective to activate the arm of the band leader. Only your own ingenuity will limit you in what you can do with this variety of motion.

Drawing B shows how you may get a circular oscillating movement. Here we have a motion that can make a person turn part way around and then back again. This is good for dancing animals.

Drawing C1 and C2 Illustrate the way of getting a very unusual motion into your animation. Here we have a device that will give you a sort of figure eight. If it is set up as shown in the drawing it is an excellent means of

Figure J



animating any performer who is balancing something. A balancer always moves around in a sort of backwards-forward-side to side sort of way in order to maintain the balance of whatever he is balancing whether it is a pole with another performer atop it or a feather on the end of his nose. If this mechanism is turned over on its side, that is the S slot in the oscillating arm be turned so that it is on its side instead of flat as shown in C1, it will give you the same motion in a vertical manner that is excellent for animating a Hawaiian dancer.

Oscillating arm C3 will give you a fairly rapid movement in one direction and a fairly slow one in the other. This motion can be either up and down or back and forth depending on whether the motor is mounted flat or on its side. It is similar to the motion obtained by the use of drive arm A3 except that it is limited to one such motion per revolution of the motor. The plate 5 shown in these drawings is merely a flat surface to hold the oscillating arm in position without restricting its motion.

With these drawings and limited description and the two preceding chapters we hope that you will be able too, to add greatly to the interest in your show when you have it on display. Good luck.

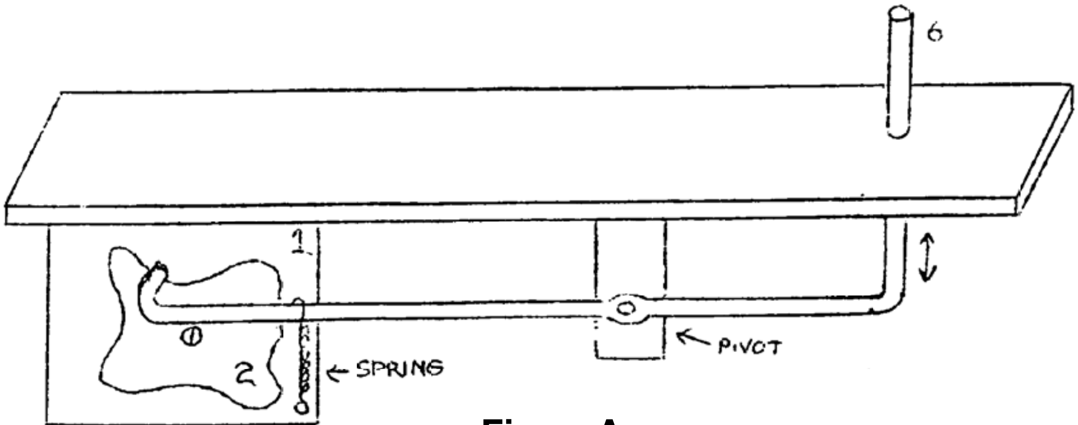


Figure A

Figure A2

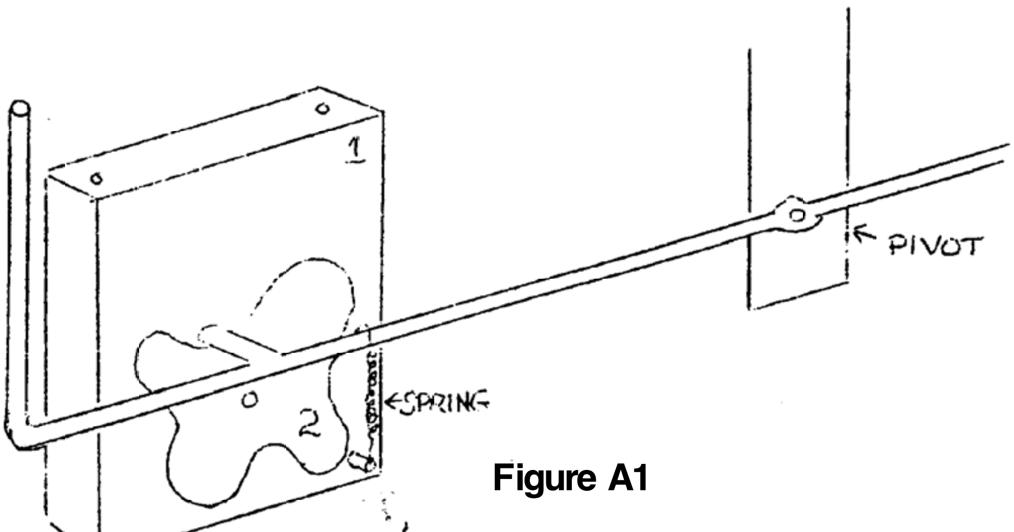


Figure A1

Figure A3

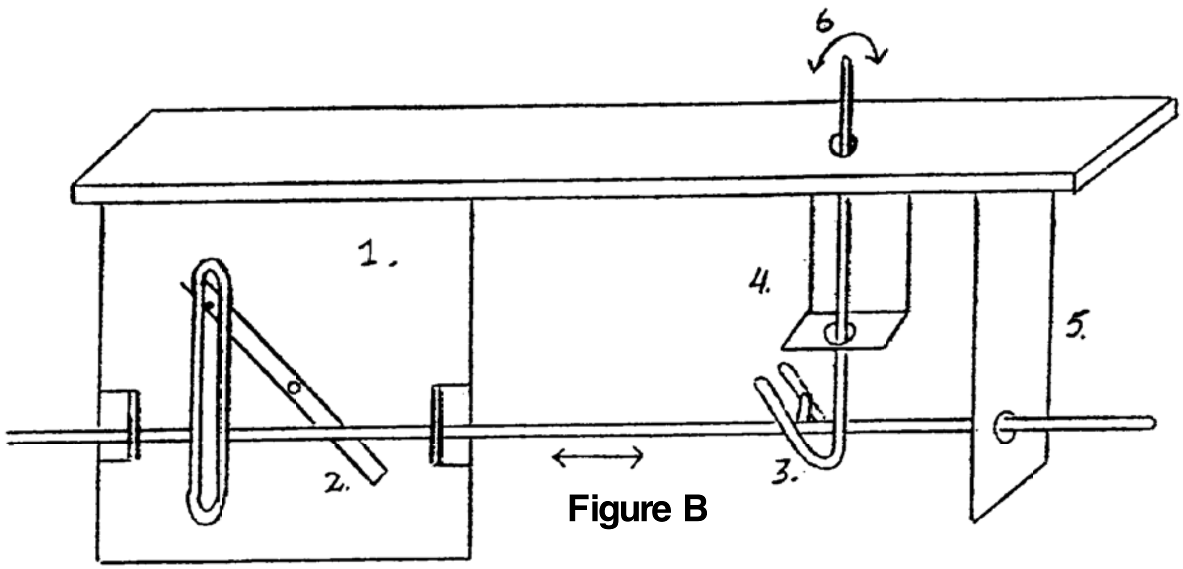


Figure B

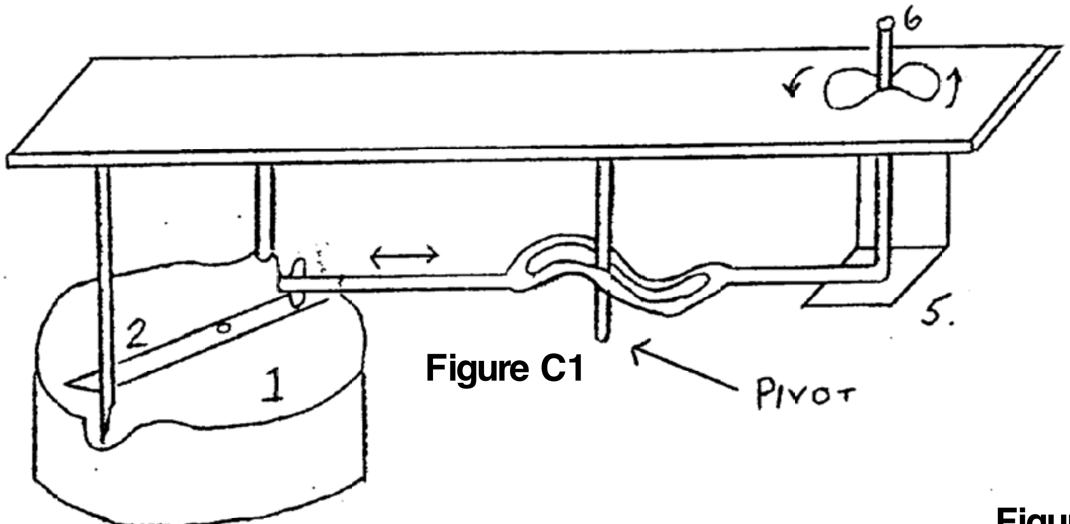
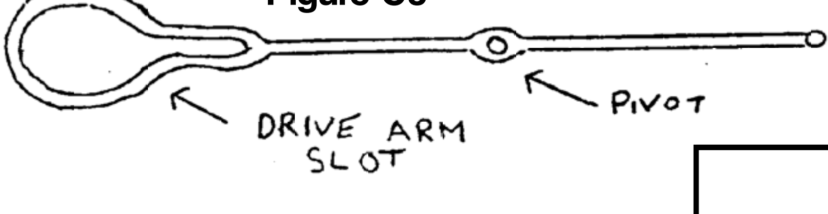


Figure C1

Figure C2

Figure C3



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