

BUILD A MECHANICAL SPEED CONTROLLER

Ed Simon

A few Falls ago, Ron Stevenson and I were watching some beekeepers use their homemade extractor to process honey 122 frames. It worked extremely well. But an operator needed to hold the variable speed drill they were using to power the extractor at a constant speed. Even with breaks and switching operators, this was extremely difficult and unbelievably tiring.

Two weeks later, we decided to solve their problem and relieve the operator of this tiring task by motorizing the extractor. Before we could tackle motorizing the extractor, we needed to develop a device for the variable speed drill that would allow the operator to set and hold a constant speed. The Mechanical Speed Controller is the result of this decision.

Note: The drill used for this article and the subsequent extractor motorization is a ½" – zero to 600 RPM variable speed drill.

Parts – Speed Controller

1. 1 ¾" x 4" – Controller U-bolt (1)
2. Sliding plate – U-bolt plate (1)
3. Welded guide nut (2) (larger thread diameter than the adjusting bolt)
4. Fixed plate – U-bolt plate (1)
5. Fixed plate welded nut (2) – Same size as the speed adjusting bolt
6. Fixed plate nut (2)
7. Fixed plate lock washer (2)
8. Fixed plate nylon lock nut
9. ¼" x 3" – Speed adjusting bolt (1)
10. Speed adjusting bolt nylon lock nut (1)
11. Wing nut (11)

drill handle at the drill's trigger location.

Note: U-bolts come with a matching U-bolt plate and two nuts. But an additional plate and two nuts of the same size for this assembly to be used for the second plate.

Step 2 – Add guide nuts to the sliding plate (part 2).

Note: The welded guide nuts (part 3) must have a larger inside diameter than the diameter of the speed adjusting bolt (part 9).

Destroy the threads of the guide nuts and the end ¾" of the speed adjusting bolt. This is so the speed adjusting bolt will not catch on the threads as it is turned. Then weld these guide nuts to the center of the sliding plate.

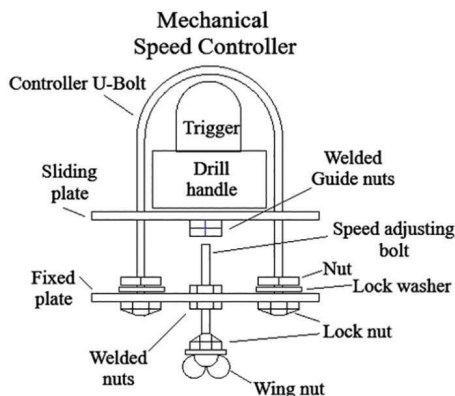
Step 3 – Assemble the speed adjusting bolt (part 9).

Add the wing nut (part 11) and the lock nut (part 10) to the speed adjusting bolt.

Step 4 – Add the welded nuts (part 5) to the fixed plate (part 4).

Drill a hole larger than the diameter of the speed adjusting bolt (part 9) in the center of the fixed plate. Then weld these nuts to each side of the fixed brace over the hole.

Hint: Tack the nut(s) in place and test the speed adjusting bolt for smooth operation. When satisfied, finish welding them in place.



Note: The nuts welded to the sliding plate are not attached to the adjusting bolt. They are used to keep the adjusting bolt point in position on the sliding plate.

Problem

The variable speed trigger on the drill worked great except the trigger could only be locked at the maximum speed. This was unacceptable, it would tear the frames apart at the high speed. What was needed was a way to use the available drill trigger to start at zero RPM (revolutions per minute) and slowly increase the speed until the desired RPM is achieved. Then the device needs to keep the RPM consistent at this operator selected speed.

Note: The parts sizes listed are for the controller described in this article. You may need to adjust these sizes to accommodate your drill.

Construction

After selecting the controller U-bolt, additional parts are added and the device is ready to be attached to your variable speed drill.

Note: It is assumed that you are currently using or have a variable speed drill that satisfies you for the use in your application.

Warning: Perform a test run before permanently welding anything in place to be sure the device will work as expected.

Step 1 – Select a controller U-bolt (part 1).

Select a U-bolt for the controller that slides very snugly over your



Step 5 – Assemble the speed controller.

Add the adjusting bolt to the fixed plate. Then, add the sliding plate and the fixed plate assembly to the U-bolt. Use fixed nuts (part 6) and lock washers (part 7) and the nylon lock nuts (part 8) to keep the fixed plate (part 4) in position.


Checkpoint

The speed adjusting bolt should fit into the guide nuts and be able to move the sliding plate by turning the adjusting bolt.

Step 6 – Add the speed controller to your drill.

Install the controller over the drill's handle and trigger. Use the speed controller to vary the speed of the drill. You should be able to vary the speed from zero to maximum revolutions for the drill. If the speed controller moves on the drill handle, you may need to add tape or any other material around it to hold it in place.



Cheap, easy to build and easy to operate, the Mechanical Speed Controller will provide a relief for your aching index finger, hands and arms. 

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