
Gate Latch

Name: _____

Date: _____

Description:

Students will build a gate latch using black pipe, round stock, and flat stock.

Materials:

9" of 3/16" x 3" Mild Steel Flat Stock

8" of 3/4" Sch. 40 Black Pipe

22" of 1/2" Mild Steel Round Stock

1" of 3/16" x 1/2" Flat Stock

Tools:

Oxy-fuel tanks with rosebud tip

Striker

Gloves

Drill press

1/4" metal twist drill bit

Arc welder (SMAW)

Blacksmith's Vise

2- 8" locking pliers

Assorted metal files

Metal chopsaw

Hydraulic Shear

Center punch

Ball-peen hammer

Combination square

Tape measure

Scrap piece of 3/4" pipe/tubing for bending

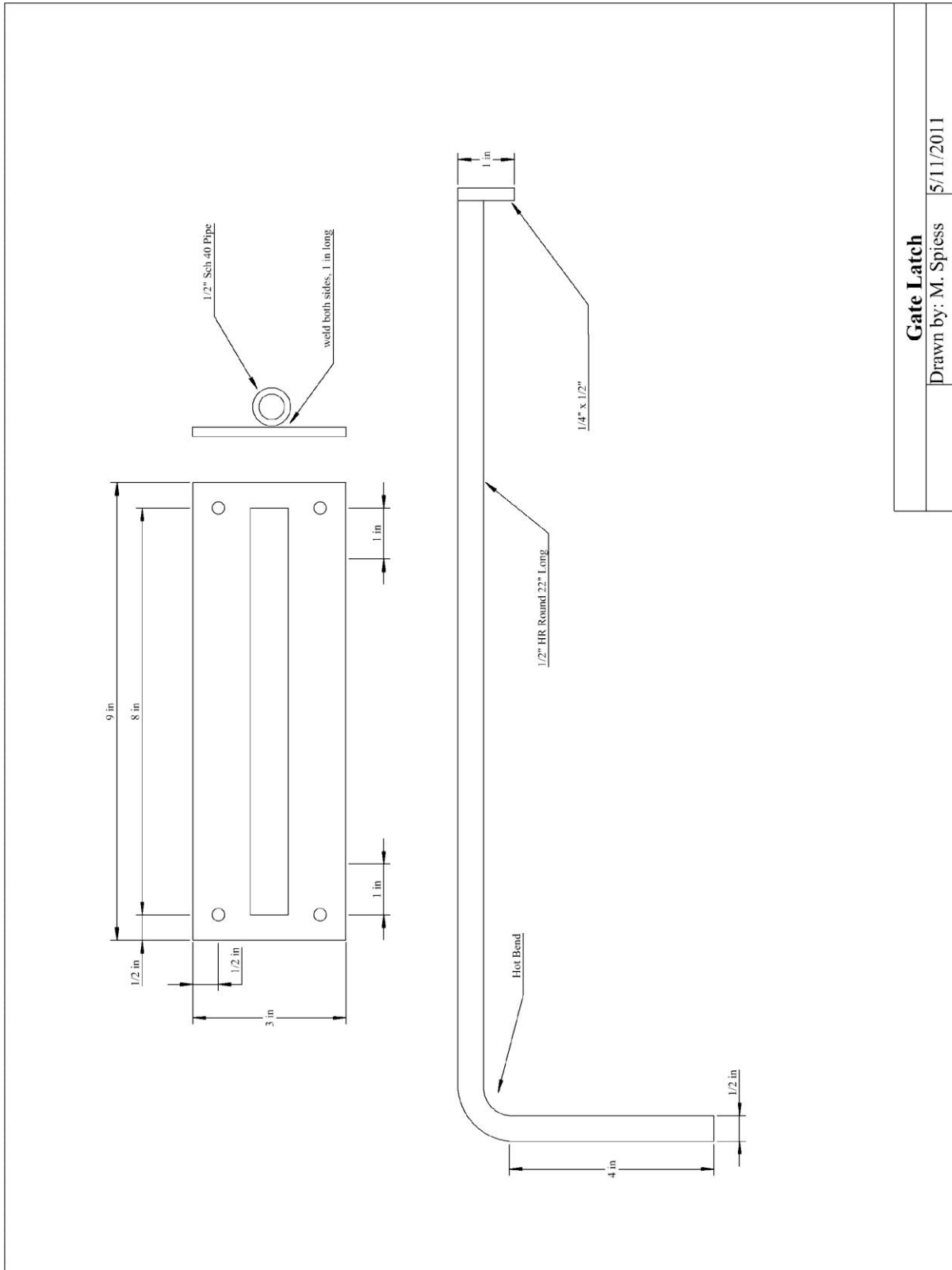
Wire brush/wire wheel

Soapstone/pencil

Procedure:

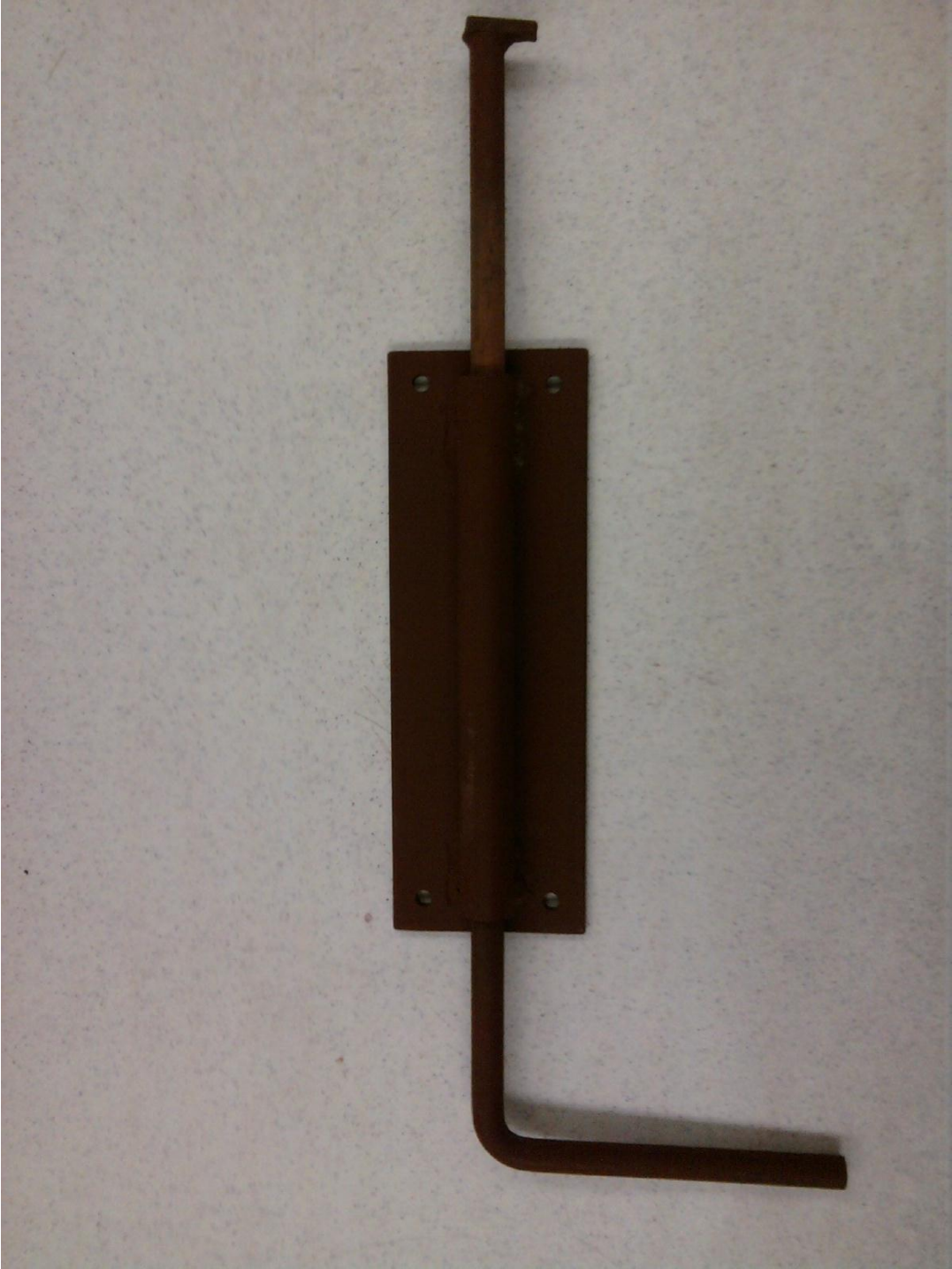
1. Review the plan and complete the worksheet.
2. Use metal chop saw to cut black pipe to length. File edges of pipe.
3. Use metal chop saw to cut round stock. File the edges of the round stock.
4. Use hydraulic shear to cut flat stock to length.
5. Mark, center punch and drill holes in the flat stock
6. File edges and holes of flat stock.
7. Place, clamp and weld the pipe to the flat stock. Tack in place on the ends before welding. Weld about 1" on both sides and both ends.
8. Heat and bend handle into the round stock.
9. Use wire brush/wire wheel to clean heated portion of the round stock
10. Insert round stock (latch) in the pipe (guide)
11. Place, clamp, and weld the stop onto the end of the latch, making sure that stop is aligned with handle

Drawing:



Gate Latch	
Drawn by: M. Spiess	5/11/2011

Photo:



Gate Latch Worksheet

Name: _____

Date: _____

1. How long is the ½" round stock cut? _____

2. What precautions should you take when bending the round stock?

3. How long is the pipe? _____

4. Describe pre-operation safety procedures for operating oxy-fuel rosebud

5. How will you clamp the pipe to the flat stock?

Grading Rubric:

<u>CRITERIA</u>	<u>POSSIBLE</u>	<u>SCORE</u>
Flat stock length	5	
½" rod length and bending	5	
Holes are drilled in proper places	5	
Guide (pipe) is centered on plate (flat)	5	
General workmanship (edges, clean welds, fit)	5	
Worksheet	10	
TOTAL	35	

Gate Latch Teachers Notes:

Agricultural Standards Met:

- 6.0 Health and Safety. Students understand health and safety policies, procedures, regulations, and practices, including the use of equipment and handling of hazardous materials:
- 6.1 Know policies, procedures, and regulations regarding health and safety in the workplace, including employers' and employees' responsibilities.
 - 6.2 Understand critical elements of health and safety practices related to storing, cleaning, and maintaining tools, equipment, and supplies.
 - 6.4 Maintain safe and healthful working conditions.
 - 6.5 Use tools and machines safely and appropriately.
 - 6.6 Know how to both prevent and respond to accidents in the agricultural industry.
- B1.0 Students understand personal and group safety:
- B1.1 Practice the rules for personal and group safety while working in an agricultural mechanics environment.
 - B1.2 Know the relationship between accepted shop management procedures and a safe working environment.
- B7.2 Know how to properly set up, adjust, shut down, and maintain an oxy-fuel system.
- B8.0 Students understand electric arc welding processes:
- B8.1 Know how to select, properly adjust, safely employ, and maintain appropriate welding equipment (e.g., gas metal arc welding, shielded metal arc welding, gas tungsten arc welding).
 - B8.2 Apply gas metal arc welding, shielded metal arc welding, or flux core arc welding processes to fusion-weld mild steel with appropriate welding electrodes and related equipment.
 - B8.3 Weld a variety of joints in various positions.
 - B8.4 Know how to read welding symbols and plans, select electrodes, fit-up joints, and control heat and distortion.

Objectives:

By properly completing this project, students will be able to:

- Read a plan to and layout dimensions.
- Cut metal to length using metal working equipment.
- Properly mark and drill holes.
- Properly assemble, clamp, and weld components of the latch assembly.
- Weld components together.
- Use hot metalworking processes to bend steel.

Alternative Tools/Methods/Materials:

Cutting torch or plasma cutter: Use instead of shop tools to cut (alternate) material. This would change the objectives by replacing the power cutting tools with oxy-fuel cutting or plasma cutter.

Cold metal bender: this would change the instruction by replacing using hot metal working procedures with cold metal working methods.

Project can be GMAW welded.

Project can be altered to include a receiver for the latch made of 1 1/2" x 1/8" angle iron with a 1/2" x 1" notch cut into it to receive the latch. (Drill and file or cut with a torch.) Drill two mounting holes to attach to a wood post.

Safety Review:

- Oxy-fuel rosebud setup/use safety
- Chopsaw safety
- Shear safety
- Drill press safety
- Wire wheel safety
- Arc Welder safety

Project Time:

Demonstration:	45 min
Build:	2 hours

Demonstration Notes

1. This project should be later in the school year, so most skills and equipment should be mastered by the students
2. Be very clear of safety issues regarding the heating of the latch. Carelessness with the rosebud can lead to serious injury.
3. Extra care should be taken when placing the pipe on the flat stock. Show students how to do this with clamps, small hammer and combination square. A simple jig can be created to hold the pipe in place while tacking.
4. Remind students to be take care when chipping slag from welds so as not to dent the project.
5. It would be easy to extend this project by creating different stops, locking mechanisms, or building a catch.

Bill of Materials:

Projects:		24					
Size	Description	Units	Qty/Project	Cost/Unit	Order	Amount	
3/16"x3"	Mild Steel Flat Staock	20' length	0.0375	\$45.92	1	\$ 45.92	
3/4"	Sch 40 Black Pipe	21' length	0.0318	\$28.51	1	\$ 28.51	
1/2"	Round Stock	20' length	0.092	\$16.04	3	\$ 48.12	
3/16"x1"	Mild Steel Flat Stock (Use scrap)	20' length	0	\$ 15.32	0	\$ -	
					TOTAL	\$ 122.55	

Project and plan by: Roy Cox