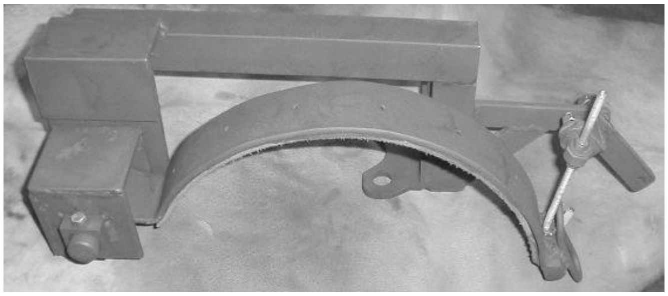
Give the Guy a Brake
or
Stop that Little Giant from Running Away

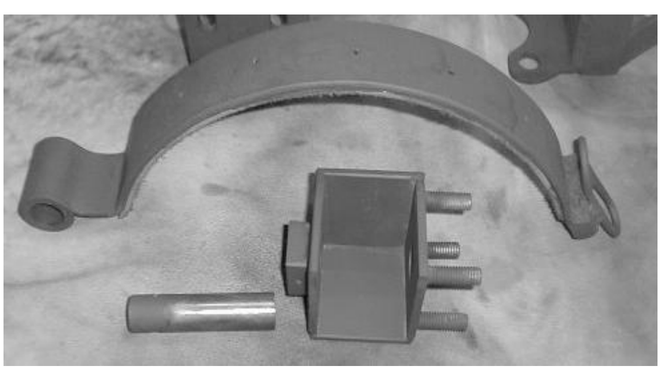
I've had the privilege of having two 50lb Little Giants fresh



Fg.1: The complete brake (from front & above)

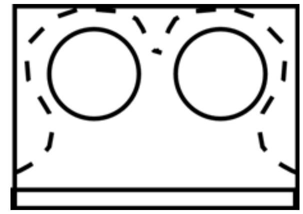
from the rebuilding by Fred Caylor. These hammers were in tip-top shape but both (at least in my hands), had a problem. If they were adjusted so that they did not continue to hammer after letting up on the foot control, they felt weak. If they were adjusted to strike hard, they ran on. I discovered that a very modest pressure (like the palm of a leather glove, lightly pressed to the flywheel) was sufficient to cure the problem. The solution was to create a brake to automatically apply that pressure when the foot control was released. What I'm going to describe here is my solution - based on the specifications of the problem and what happened to be lying around in my shop (Fg.1)

The first question is just how to provide the frictional force on the flywheel. I chose to dig a leaf spring out of my trash heap, since it already had an eye, was obviously strong enough, and was free. The leaf spring was approximately 20" long (excluding the eye), 2.25" wide and 0.25" thick. The length was determined by just cutting the spring in half. The spring was heated, the eye and 2" of spring were bent at right angles to the rest of the spring, and the remainder was bent into a curve slightly tighter than the flywheel. It was then quickly pressed to the flywheel to set the correct curvature. The process didn't even blister the paint on the flywheel (see Fg.2). A piece of ½" square stock was welded to the non-eye end and a loop of 1/4"



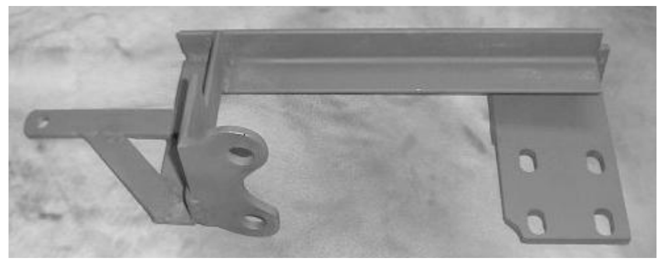
Fg.2: Brake shoe & mounting box

round stock was welded to the block to form a loop above and below the spring end and approximately ½" from the spring. Once a coat of paint had dried, a strap of leather (smooth side to the metal) was contact glued in position.



Fg.3: Brake Mount

The next problem is figuring out where to mount the brake shoe. On my first hammer, I took the simple route of mounting it on the lower portion of the flywheel. Of



Fg.4: Mounting arm (from behind & below)

course, eventually, the oil from the hammer soaked the leather and the frictional force dropped off. On all subsequent versions, I've mounted the shoe on the top of the flywheel. The problem is now figuring on how to hold the shoe in place.

Fg.5: Mounting arm (from behind & above)

If you look at a Little Giant (at least all the 50's I've looked at), there are four large bolts holding down the journal cover between the flywheel and the drum. Since I knew that I was going to rig a linkage on the left side of the hammer, I elected to build a flange to fit over the two bolts on the left. The flange consisted of a 4.5" long piece of 2.5"x2.5" x 1/4" angle iron (Fg.3). Two 7/8" holes were drilled to correspond to the bolt holes and the metal was cut away along the dashed lines in Fg.3. This was done to accommodate the bulge between the bolts in the journal plate and to insure that nothing contacted the flywheel or drum mechanism. The section of the angle iron perpendicular to the mounting plane makes a convenient attachment point for the rest of the mounting arm (Fg.4). An eight inch piece of 1"x1" angle iron was welded to that section on the flywheel side and a 14" piece of 1"x1" angle was welded to the 8" piece as shown in Fg.4.

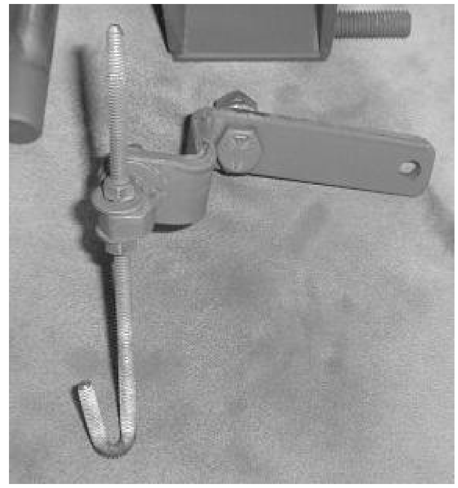
The next problem is to attach the brake shoe to the brake arm. Since this particular brake was going on a hammer about 150 miles from where I was building the brake, I decided to build a bit of adjustment into the system. If I was building this for a hammer that was immediately available for trial fitting, I would have omitted much of what I'm about to describe. I first cut a 3" long piece of 3" wide x 1/4" thick stock, flush welded 4 1/2x13 bolts in the corners of the plate (see Fg.2), and drilled a 1" diameter hole in its center. A slotted plate (4.0" x 6" x1/4") was created to correspond to the bolt pattern (see the plate in Fg.4 and 5 to the right - the one with four slots). Three more 3"x3"x1/4" plates were cut and welded into the mounting box shown in Fg.2. Finally, a 1" diameter hole was drilled directly in line with the centered hole in the bolt plate. A 1" diameter hole was also drilled in a 1.5" x 1.5" x ½" block and that block was welded over the hole in the front plate of the mounting box. A 1" diameter pin (4.5" long) was inserted into the box so that it was flush with the bolt (=rear) plate, and a 1/4" hole was drilled through the 1.5"x1.5" block and pin to form a lock mechanism. All that was left was to pull the pin, bolt the rear plate to the slot plate, insert the eye on the shoe into the box, and reinsert and lock the pin in place. Whew. Obviously, this could be simplified considerably. The reason for the 1" pin was that was the internal diameter of the eye. Had I rolled the eye or chose to use a bushing, a smaller pin could have been used. If trial fitting was available, the bolt plate and slotted plate could have been exchanged for a single plate and a large bolt could have been used as the pin (with a nut as the lock mechanism). In fact, this is what I would recommend as the preferred method.

Okay - we now have the shoe resting on the flywheel, the brake arm bolted to the hammer, and the 14" piece of 1"x1" angle (remember?) running above and behind the flywheel. We need to connect that piece to the slotted plate. The easy solution? ... position a 4" piece of angle iron to bridge the gap (see Fg. 5), hold in in place with vise-grips, then weld it to the arm and slot plate.

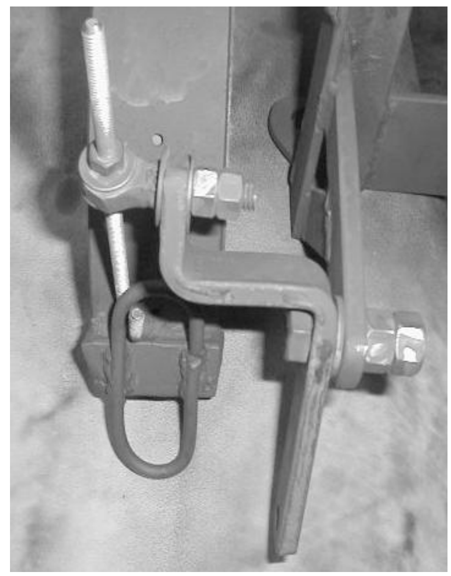
All that is left is actually making the contraption work. The concept is that a spring will be attached to the lower loop on the non-eye end of the shoe and hooked to one of the ram bolts on the hammer with a small turn-buckle. This will apply the brake. To release the brake, we have to lift the shoe while the foot treadle is depressed, i.e., the downward motion of the treadle must somehow be reversed to lift the shoe off the flywheel.

The first step in accomplishing this is to weld a control bracket to the 8" piece of angle - the 'Y' shaped assembly to the left in Fg.5. It consists of a 6" long piece of 1" x 1/4" bar with a ½" hole in the end and a brace bar. We now need a control arm.

Take an 8" long piece of 1"x1/4" stock and bend it into a square Z-shape as shown in Fgs. 6 & 7. The lengths of the limbs are 2", 2" and 4". A 3/8" hole is drilled into the forward (2") limb, a ½" hole is drilled into the rear (4") limb (near the bend) and a final 3/8" holes is drilled into the end of that limb. The pivot mechanism (the thing holding the hook in Fg.6) is made from by welding a ½" nut to a 3/8" bolt head (so it kind of looks like a magnifying glass). Run the 3/8" bolt through the 3/8" hole in the front limb and double nut it to lock it in place (but do it loosely enough to allow pivoting). Make a hook from a piece of 1/4 x 20 all-rod. Put a nut on the hook, then a washer, hook the upper loop on the non-eye end of the shoe, run it through the ½" nut, and finish the assembly with another washer and 1/4" nut. You can now adjust the hook up and down as needed and lock it in place in the pivot. Run a ½" bolt through the rear limb and double nut it in place on the control arm (again - make sure it can move). All that is left is to attach a turn-buckle to the 3/8" hole in the 4" limb and attach the other end to the treadle mechanism.



Fg.6:Control arm (from front)



Fg.7:Control arm (from side)

The 'stopping' ability of the brake is related to the strength of the spring used to hold the brake down (and the adjustment of the turn-buckle) and the 'release' is controlled by the turn-buckle on the 4" limb. When adjusted correctly, the hammer can give a single strike, the ram can be walked into any position, and the drum control can be adjusted to give maximum striking power. The afternoon needed to assemble the brake is well worth the effort and I personally wouldn't want to run a hammer without one.