

THE “TWISTED ‘I’” SQUIRREL-PROOF (SO FAR) BIRD FEEDER



Fig. 1 Bird Feeder with (from the top) Nylon Rope with Pulley, Squirrel Baffles, 2nd floor Wren House, Bike Axle, 1st floor Wren House, Twisted “I” Magnet Array, Azimuth setting, Bird Feeder, and Birds

The Twisted I bird feeder has several unusual features: Two plastic electrical boxes are used to mount a bicycle front axle, for smooth horizontal rotation. Since the boxes aren’t doing anything else useful, wren-sized holes are cut in the boxes, so that wrens or other small birds can find habitations. An array of 23 ceramic magnets points the feeder toward magnetic north, (in the absence of big birds or strong winds) and an azimuth adjustment permits selection of the aspect seen from the people-house. On the end of the bird feeder, what could be an interspecies symbol for a bird feeder is made using reflective tape. The tape is actually covered with many tiny retro-reflectors, so that light from a flash camera is redirected back to the camera, rather than wide-angle scattering. The normally red reflector shows up as yellow on illumination from a

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camera, possibly because of saturation of the photosensitive element due to the efficiency of concentration of the light. See Fig. 2.



Fig. 2 Flash picture of bird feeder. Note that the retroreflective tape is very bright, even though the angle with the normal is close to 30 degrees ($\text{ATAN}(8 \text{ in.}/4 \text{ in.}) = 27^\circ$).

A 35 lb. counter-weight is at the other end of the rope, to lower the bird feeder for service, and raise it to challenge the squirrels, possums, armadillos, et al. as seen in Figs. 3 and 4. The Bird feeder weighs about 20 lb., so as long as there are no flying armadillos in the neighborhood, the counterweight can hold its own.



Fig. 3 Feeder Up, Counterweight Down Fig. 4 Feeder Down, Counterweight Up

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Fig. 5 shows the bicycle front axle mounted between plastic electrical boxes, with holes cut for possible wren tenants. The author, 1st Lt. Dixon W. C. retired, is also shown.



Fig. 5 Dixon with Relatively Rotary Wren Residences



Fig. 6 Old home-made shelf with wren nest from 2009

At present, 9 July 2010, there are four potential wren houses in our yard, but the one active wren nursery last year consisted of a nest (Fig. 6) in a spike shelf in the garage, reached by going through an open window, passing a “wren house” on the way in, visible in Fig. 7. The white things above the nest are spikes left over from an ancient project, but may encourage laying eggs to a timid wren-mama. A fourth bird house, from the Philippines, is seen in Fig. 8.

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Fig. 7 Wren house in open garage window



Fig. 8 Vacancy in Philippine Wren House

Twisted “I” Bird Feeder

Two squirrel baffles above the feeder keep creatures from coming down from the tree to the feeder, and a height of 50 inches from the seed catcher makes it difficult to jump up. By “seed catcher” is meant the raised platform under the bird feeder. It is an inverted plastic trash can lid screwed down on top of a plastic lattice-work box to catch the seeds raked out by some birds, e.g. bluejays, looking for their favorite seeds. That box has openings that let sunlight in so that the grass *might* grow. (Fig. 4). The box was knocked over, one night, possibly by a passing opossum, so a 15-lb. stepping stone was put inside the plastic lid. On top of the stone a piece of plastic turf is screwed down, to reduce scattering of the seeds. Unfortunately, the birds have messed up the real grass under the bird feeder, looking for seeds that have been scattered there. That may be the next frontier, designing bird-proof grass. One possibility would be 0.5” mesh hardware cloth on top of the grass. Then Ramiro, who cuts our grass, might have to use a Weed-Eater to trim the grass that grows through the wire cloth.

I have measured a leap of 40 inches by a squirrel. Not counting his tail, his body length was about 10 inches, maximum. That’s like a 6-foot human doing a standing high-jump of 36 feet. I witnessed a world record *pole vault* being set by Sjiel (pronounced “Shell”) Isaacson at the Texas Relays in Austin of 18 feet, two inches, a few years ago. I’m afraid if scale were taken into account, and squirrels were permitted to compete, they would win the high jump, hands (I mean paws) down. If they were permitted to enter the pole vault, *sans* pole, they could dominate that event, too.

A combination of a vertically oriented bar magnet and a pair of smaller horizontal bar magnets align the bird feeder by pointing toward magnetic north. To control the

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orientation of the bird feeder relative to the view from the house, a 5/16-inch turnbuckle is used to make a fairly high friction vertical axle, so that the orientation is adjustable by hand, but not by birds or wind or squirrels, (assuming they don't start pumping iron). The turnbuckle used is adapted by threading a left-handed nut on the hook bolt, to lock it, since we are only using it for convenience in orientation, not in height adjustment, and putting some medium-strength thread-locking cement on the right-hand threaded eyebolt end. The added friction does a fairly good job of allowing one to adjust the aspect presented to the back room of the house. The threaded hook is hung from a hole drilled near the edge of a 2" wide flat aluminum piece screwed to a 1" by 1" square aluminum tube on which the vertical bar magnet is mounted. The preferred direction is with both sides of the bird feeder visible from the people-house.

Fig. 9 Twisted I Bird feeder with visiting Chickadees and one hovering Cedar Waxwing?



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Fig. 10 Hovering bird at shutter speed of 1 millisecond

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Fig. 11 Pulley No. 2

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Fig. 12 Unidentified Flying Creature (UFC) and Chickadee and Squirrel

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Fig. 13 A telephoto camera on a tripod in the back room has captured some candid pictures of wild life in the area to the east of our house, where the bird feeder is hung. A few of these are seen in Figs 14 to below.



Fig. 14 A male cardinal

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Fig. 15 A male Cardinal, a cedar waxwing, and an escaping small bird

Maybe the best thing for discouraging squirrels is that safflower seeds, which the squirrels dislike, but the birds will eat, make it unprofitable for the quadrupeds to make the effort. Thistle is also used to attract finches and other little birds, but squirrels eschew.

To control the height of the bird feeder, a 1/4" nylon rope goes over a pulley near the tree branch that supports the feeder. The rope goes from that first pulley to a second pulley attached to a clothes-line pole. From the second pulley, the rope goes to a third pulley, attached to a 35 lb. weight. The length of this segment is adjusted using a taut-line hitch. A taut-line hitch, for nylon, consists of a standing end which goes up to the second pulley. , shown in Fig. . Following the rope down, this goes around pulley 3 and up, making 3 loops around the standing end, and another loop with the free end of the rope between the three loops and the last loop, as in Fig. . This knot is

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used during installation, at least, when the proper length of the rope is not known. The counterweight consists of a 5/8 inch eyebolt imbedded in concrete in a plastic bucket.

The “bar magnets” are really clusters of rare earth magnets between iron bars, used to hold tools. The longer magnet consists of 9 ceramic magnets, with a bar length of 24 inches. The shorter magnets enclose 5 ceramic magnets within a 13 inch length. The manufacturers were careful to get the magnets aiding each other, but the net effect relative to the mounting brackets is inconsistent, since most tools are not too choosy. The mounting brackets are the only obvious departure from symmetry, and with a map compass I found that some are one polarity, and some another. It was convenient for the research, because I could readily switch polarities of the bars by choice of bar magnets. The research consisted of a comparison of stability of north-pointing, with two vertical magnets separated horizontally by 2 to 12 inches, and later, one vertical and one horizontal magnet. The best, so far, is one vertical magnet and two horizontal smaller magnets. The pair of horizontal bar magnets are mounted on either side of the vertical bar magnet, so that the fields from their ends are pointed similarly to the fields in the horizontal plane from the vertical bar magnet. Two magnets are used to maintain balance, with the center line of gravity running through the center of the baffles, the vertical magnet, the line midway between the horizontal magnets, centered on the boxes, the axle, and the bird feeder, Also, the horizontal bar magnet pair is twisted 90 degrees from the direction of the horizontal roost on top of the vertical one, a vestige of an earlier horizontal magnet mount, that turned out to be less than optimum.



Fig. 16 35 lb. Counterweight, pulley # 3 and taut line hitch

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Each horizontal magnet is mounted on an aluminum piece for convenience in fastening it to the magnet support, which is a square aluminum tube. They are constructed so that the upper roost, the vertical bar magnet, and the lower bar magnet make a kind of twisted “I.”

Earlier, I had over-estimated the correct size of the counterweight, and the extra weight makes the counterweight just about right. If the counterweight exactly balanced the weight of the bird feeder, then I could see one of the more muscular squirrels pulling it down, or perhaps one or more of the heavier birds might save him the trouble.

I mentioned that I was feeding the squirrels on the apron. One day, 15 June 2010, I was a little late getting their breakfast, so they took matters into their own paws. One of the more enterprising squirrels knocked a clear plastic box full of sunflower seeds off of a high shelf, and helped himself when the lid popped off. So, I got a stainless steel trash can and put the seeds in a jar within it. Then, I realized they could knock it over, since it was pretty light. I have a weight that I made earlier, using an eye bolt in some concrete and nails in a plastic jar, about 13 lb., and I made a belt out of hardware cloth and bolted the ends of the hardware cloth together, with the cloth form-fit to the round food container and the rectangular weight jar. See Fig.12. As of 10 July 2010, the squirrels haven't solved their latest problem. A plastic jar full of seeds inside the metal can makes it difficult, even if the little creatures can pry open the lid of the food container.

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Fig. 17 Sunflower Seed Bin for Apron Diners

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The parts for the bird feeder were all purchased from Breed Hardware in Austin, Texas, except the bicycle axle, which was obtained from University Cyclery.

A limited number of these will be built to order by Dan Coulbury of Coulbury Design.com. Dan’s specialty is custom furniture, but he will be glad to consult with bird lovers who want a somewhat different bird feeder. Installation is a possible option in or near Austin, Texas.

Below is a poem that verbally describes how things were at one time. Lately, the squirrels have to settle for sunflower seeds on the apron of the garage.

We have a feeder for birds.
It doubles as dinner for squirrels.
Although we try to limit the clients
To creatures with feathers
by measures, from baffles
to pivots and pulleys
And wren-house swivels,
To heights fantastic for leaping,
The squirrels prevail,
And shake their proud tails
As their one-ounce brain,
With might and main,
Outdoes the human with his,
Which we hope is bigger

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By some. Now we just watch,
And exclaim with delight
When a squirrel descends
A rope from the heights,
Or leaps from below.
That’s squirrels—Now birds:
Somewhere behind
A cardinal
Or Texas Mocker
Or woodpecker,
Is a sparrow below
And a dove above.
Blue jays have color
And spew the seeds far
And grackles make “music,”
But mostly they dine
Around on the ground.
An inverted lid
On the basket below
Catches seeds that the
Squirrels and Jays
Rake down.
There’s an obvious collusion
Twixt the critters above
And their buddies below,
As they dine in grateful profusion.
—Dixon W. C.