

A COMPOUND LEVERAGE BANDING PLIERS

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Observations of banded geese at the Swan Lake National Wildlife Refuge over a period of 12 years have shown that bands not properly applied have been lost or have contributed at times to the premature death of the banded bird. If bands are not completely closed, their open ends may catch on vegetation and the bird may become easy prey to predators or, in the case of diving ducks, drowning may result.

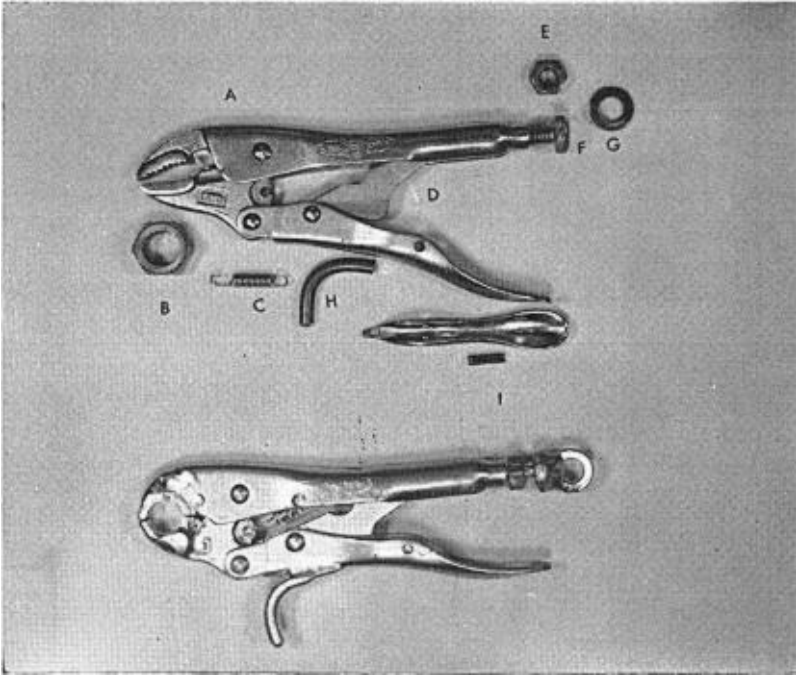
During the first years of banding at the Swan Lake Refuge, bands were closed with common pliers. This method of closure left a gap between the ends of the band. In order to eliminate this gap it was necessary to flatten the band on one side. This prevented them from rotating on the leg, and, as was evident when birds were retrapped, they had worn very thin at two points and were beginning to open where the ends meet. This flattening method is still being used by some banders and is recommended by the U. S. Fish and Wildlife Service (1956) in the Bird Banding Manual.

Proper band application is accomplished when the band, after being placed on the bird's leg is perfectly cylindrical and the ends are butted tightly together. Bands installed in this manner will rotate freely on the leg, distributing the wear equally around the inside perimeter of the band.

Several attempts have been made to perfect a tool which would easily close bands. The Bird Banding Manual describes a type of banding tool which consists of a pair of pliers with a hole drilled in the jaws to fit a given band size. These will close the band, but when the pliers are released, the spring action of the band material will usually cause the band to partially open. It is then necessary to flatten the band to close the ends. Larsen (1968), while stationed at Sand Lake National Wildlife Refuge, developed a banding tool which would close and flatten the band in one operation. This was accomplished by fitting a pair of pliers, similar to those described in the Banding Manual, with a pair of cams which would flatten the band after it was closed. This tool, which comes as close to accomplishing the desired results as any tool previously designed, is difficult to make because of a milling operation and the close hand-fitting that is necessary to achieve the proper operation of the tool. No provision is made for adjustment should it become necessary because of wear or slight changes in band manufacture.

While stationed at the Swan Lake Refuge, I constructed a banding tool by modifying a pair of compound leverage pliers, commonly known as "Vice Grips" (Figure 1). This tool, which will close a band perfectly in one easy operation, is simple to make and has provision for adjustment should it be necessary. The original tool was made for banding geese but has since been perfected for all band sizes 3 through 9. Perfect band closure is accomplished by compressing the metal in the band around its entire circumference.

Lists of tools, materials, and instruction for construction of the compound leverage banding pliers follows.



Tools Oxygen-acetylene torch (for brazing & cutting)
 Drill press or hand drill
 Metal drill to match band size (see Table 1)
 Hacksaw
 Metal files (round and flat)

Materials Compound leverage pliers of Figure 1 (see Table 1)
 Hexagon nut, (see Table 1)
 3/8" for 8" pliers
 Hexagon nut, NC, 1/4" for 5" pliers,
 5/16" for 7" and 3/8" for 8" pliers
 Lockwasher
 Steel rod, 3/16" x 1 1/2"

Construction

1. Select plier size (A) and nut size (B) from Table 1.
2. Remove return spring (C), adjusting bolt (F) and unlocking lever (I) (Figure 1). Discard unlocking lever.
3. Install nut (E) on adjusting bolt (F) leaving three threads showing between nut and knurled knob. Replace adjusting bolt into body.
4. Close pliers, making certain that lever (D) remains seated against adjusting bolt (F).
5. Drill nut (B) to proper size.

TABLE 1. SPECIFICATIONS FOR CONSTRUCTION OF PLIERS TO ACCOMMODATE VARIOUS BAND SIZES

Band size	Plier size	Nut size*	Drill size
# 3	5½"	1/4"	9/32"
# 4	5½"	5/16"	11/32"
# 5	5½"	3/8"	13/32"
# 6	5½"	7/16"	29/64"
# 7A	5½"	½"	17/32"
# 8	7"***	3/4"	7/8"
# 9	8½"	7/8"	1"

*Hexagon nuts may either be NC or NF.

**Can be made from 8½" pliers if more leverage is desired.

6. Lay nut on plier jaws so that one side of hex is seated against shoulder where jaws are fitted to plier body. Mark jaws and remove excess material with a cutting torch. Braze nut to both jaws of pliers.
7. With use of a hacksaw, cut nut through center on a line about 15° to main plier body.
8. Open pliers and add 1/4" of bronze to hump on lever (D).
9. Bend 3/16" rod (H) and braze to plier handle.
10. Braze 3/8" lockwasher (G) to knurled knob on adjusting bolt (F).
11. Remove sharp edges from jaws and replace return spring.
12. Adjust pliers so that proper band closure is obtained when knob on lever (D) touches underside of plier handle.
13. Tighten locknut (E).
14. Attach leather thong to lockwasher (G).
15. Paint plier handles for easy identification.

To apply the band the operator holds the bird on his lap with its feet and its head next to the operator. A band is placed on the bird's leg with the opening up and held in place with the forefinger of the left hand. Then the jaws of the pliers are placed over the bird's leg, with the movable handle up, between the band and the foot. The plier jaws are slipped over the band and tightened to close the band.

LITERATURE CITED

- LARSEN, KENNETH H. 1968. Banding pliers for pre-opened bands. *J. Wildl. Mgmt.* 32(2): 425-426.
 U. S. Fish & Wildlife Service. 1956. Bird Banding Manual, Sec. 1420: Applying Bands, and Sec. 1430: Field Record Equipment.

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