

Some Observations on Plankton Net Cod End
Types and Subsequent Larval Fish Condition

by

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Introduction

It was brought to our attention in 1974 that the larval fishes collected in the ICNAF (International Commission of the North Atlantic Fisheries) bongo net samples were generally in poor condition and often in such poor condition that they defied identification.

To improve this condition, several different types of cod ends were designed and built at the NEFC (Northeast Fisheries Center) and tested on the ICNAF Larval Herring Cruise 75-2 on board ALBATROSS IV.

The cod end types were rotated every second station so that they all were used under every type of sea condition and tow duration. The results were determined in two ways. First, the utility of each type was evaluated by the personnel on the cruise (Table 1). Secondly, the condition of the sorted larvae were independently judged by Dr. Thomas McKenney (Fisheries Biologist, NMFS Narragansett Lab, Narragansett, R. I.). An evaluation of each cod end type's performance was made by comparing McKenney's observations with the type of cod end used at that station.

The following is a description of the cod end types and the results of their testing.

Description

Four different types of cod ends were tested and compared. There were two different types of buckets (screw-on and twist-on), a sock or mitten, and the conventional clips. The screw-on type buckets were made of PVC pipe and plate, forming a cup of approximately one quart volume for the neuston and 6l cm bongos and approximately one pint volume for the 20 cm bongos. The cup or bucket part of the cod end fits snugly into a second piece of pipe that is clamped to the cod end collar of the net. From this collar section a strap with a securing wing nut is used to hold the bucket in position. Windows were cut out of the sides of the buckets and screen mesh inserted to aid in the collection of the sample (fig. 1).

The twist-on type bucket was developed using existing "off the shelf" PVC plumbing connections. This type differs from the screw-on type only in that the bucket is secured to the collar by twisting the bucket a partial turn with pins fitting into slots in the collar piece (fig. 2). This type was tested mainly from the utility aspect as there should be no difference in its collection of the sample than the screw-on type bucket.

The mitten or sock type of cod end uses a PVC collar that is attached to the net with a worm screw clamp. Attached to the other side of this collar is a mitten made of the same size nitex mesh as the net to which it was attached (fig. 3).

The fourth type of cod end tested was the simple paper fastener that was and is currently being used on all larval fish surveys. This type folds the cloth cod end of the net over on itself several times and then is then clipped with the fastener. The handles of the fastener are also tied around the net with twine to insure its not falling off during the course of a tow (fig. 4).

Results

The results, as stated earlier, are broken into two parts; first, their utility at sea as determined by the scientists on board ALBATROSS IV 75-2, and secondly, the resultant condition of the larval fishes captured by each type of cod end.

At the completion of the cruise, each scientist was asked to evaluate each type of cod end for its utility on each type of net towed in the following format shown below.

Preference List for Cod End Utility

	<u>Neuston</u>	<u>20 cm</u>	<u>61 cm</u>
Clips	_____	_____	_____
Mittens	_____	_____	_____
Screw-on buckets	_____	_____	_____
Twist-on buckets	_____	_____	_____

Comments:

The scientists were asked to rate each type using the number 1 for most preferred and number 4 for least. From these preference lists (table 2), it is demonstrated that the buckets were consistently preferred over the mittens or clips. The scientists felt that the buckets not only improved the method of sample collection but that their use also reduced on the time required to gather the samples, thereby reducing overall station time.

The second set of results comes from Dr. Thomas McKenney's evaluation of the condition of the larval fishes captured by the nets. It appears from his evaluation that larvae were in overall better condition using the buckets than either clips or mittens (table 3).

Conclusions

It is obvious, from the above results, that the bucket cod end is the most desirable type to use. This is not only due to the condition of the sample collected, but also because of the ease and efficiency of the ship's deck operations. There is, however, one serious drawback to the use of such bucket type cod ends, and that is concerning safety. These PVC items have a certain amount of weight and require some care to insure that the deck personnel are not hit with them in rough seas. Although this is indeed a serious drawback, I feel that it can easily be overcome by having the cod ends made strong enough to withstand a reasonable impact with either the ship's hull, each other, or the deck on recovery. This would allow the nets to be lowered to the deck without the need to have anyone near them on the occasions that the watch chief felt were dangerous. Otherwise, they could be a useful tool in collecting a better plankton sample.

One suggested type of modification is shown in figure 5, although I have not pursued its construction and therefore have no costs per unit for it.

Appendix

Concerning the use of the light screw on plastic jars as an alternative method of bucket cod end

From our experience here at the Center, these plastic jars have never worked very satisfactorily. They have a tendency to "pop off" upon impact with anything and to split open in colder weather. I would estimate that on about 40% of the tows that we made with these jars on the RESEARCHER 76-1 in December 1976, at least one sample of the bongo array was lost. I would therefore suggest that they not be used simply due to their reliability.

Table 1. Personnel list for Albatross IV 75-2

<u>Name</u>	<u>Title</u>	<u>Organization</u>
R. Gregory Lough	Chief Scientist	NMFS-NEFC, Woods Hole, Ma
David C. Potter	Biological Technician	" " "
Kenneth Converse	Biological Aide	" " "
Susan Monroe	Biological Technician	" " " Narragansett, RI
Lauri Sullivan	Biological Technician	" " " "
Clintona Smith	Cooperative Student	Darien, Conn.
Thomas Potter	" " "	U. of Maine, Walpole, Me
Justin Kuo	" " "	S.M.U., Dartmouth, Ma.

Table 2 Scientific personnals evaluation of the different cod ends tested on 75-2. A number one indicates the first choice and a number four the worst.

	61 cm Bongos								TOTALS
Clips	4	4	4	3	3	4	4	4	30
Mittens	3	3	3	4	2	3	3	3	24
Screw-on buckets	2	2	2	2	1	2	1	1	13
twist-on buckets	1	1	1	1	4	1	2	2	13
	20 cm Bongos								
Clips	2	4	4	4	2	4	3	4	27
Mittens	1	1	1	3	3	3	2	3	17
Screw-on buckets	3	3	2	1	1	2	1	2	15
Twist-on buckets	4	2	3	2	3	1	4	1	20
	Neuston								
Clips	1	2	4	4	4	2	4	4	25
Mittens	2	4	2	3	3	3	1	3	21
Screw-on buckets	3	1	2	1	1	2	2	3	15
Twist-on buckets	3	1	3	1	2	4	3	1	18

Table 3. Larval fishes condition from McKenneys evaluation from sorted material.

cod end type	Number of trials	larval condition		
		Good	Fair	Poor
Buckets*	34	3	14	17
		8%	41%	50%
Clips	24	0	7	16
		0%	29%	66%
Mittens	16	1	2	13
		6%	12%	81%

* Both types of buckets are grouped together because their only differences were in utility and not in sample condition

Figure 2 Twist-on type bucket

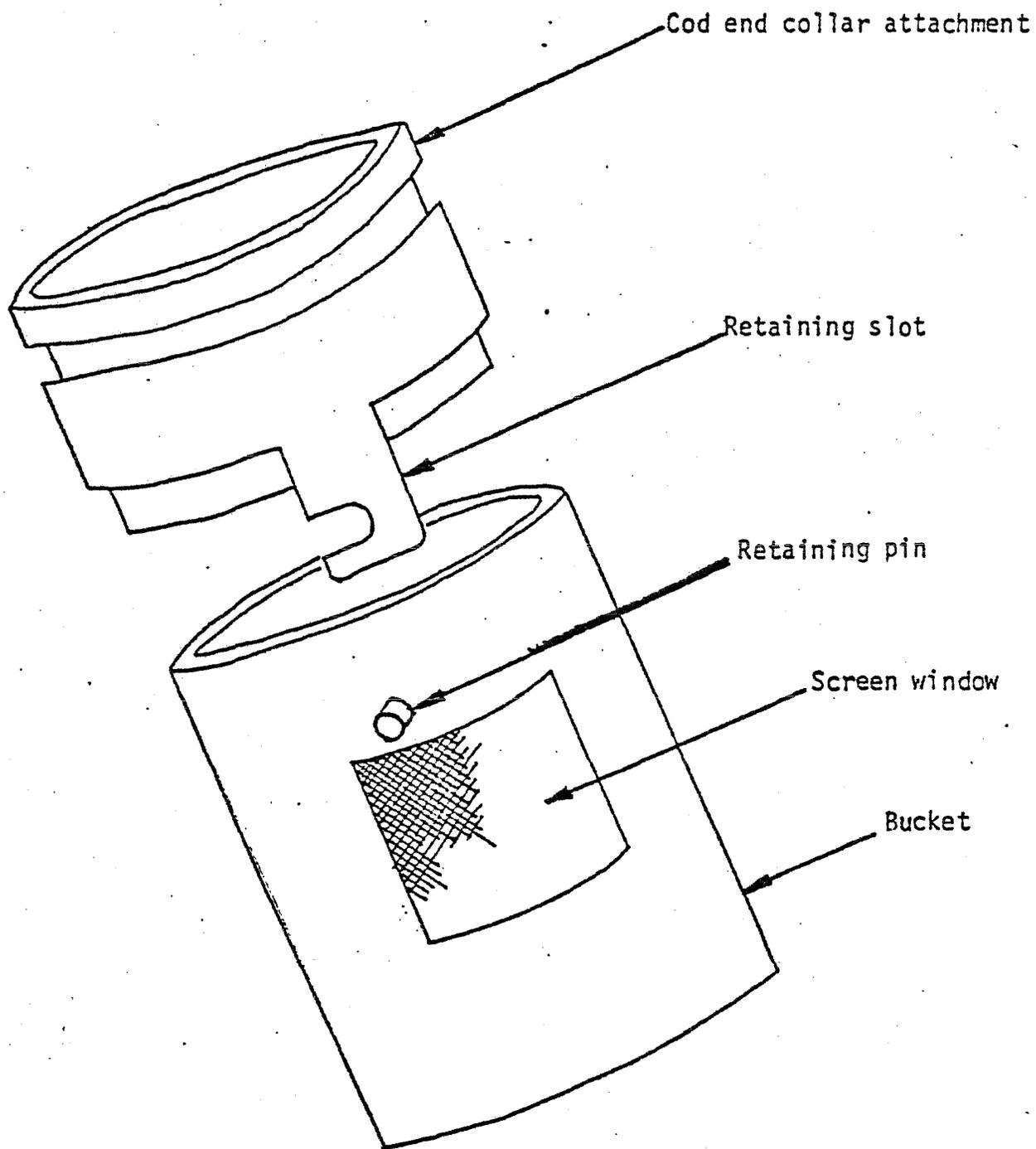


Figure 3 Mitten type cod end

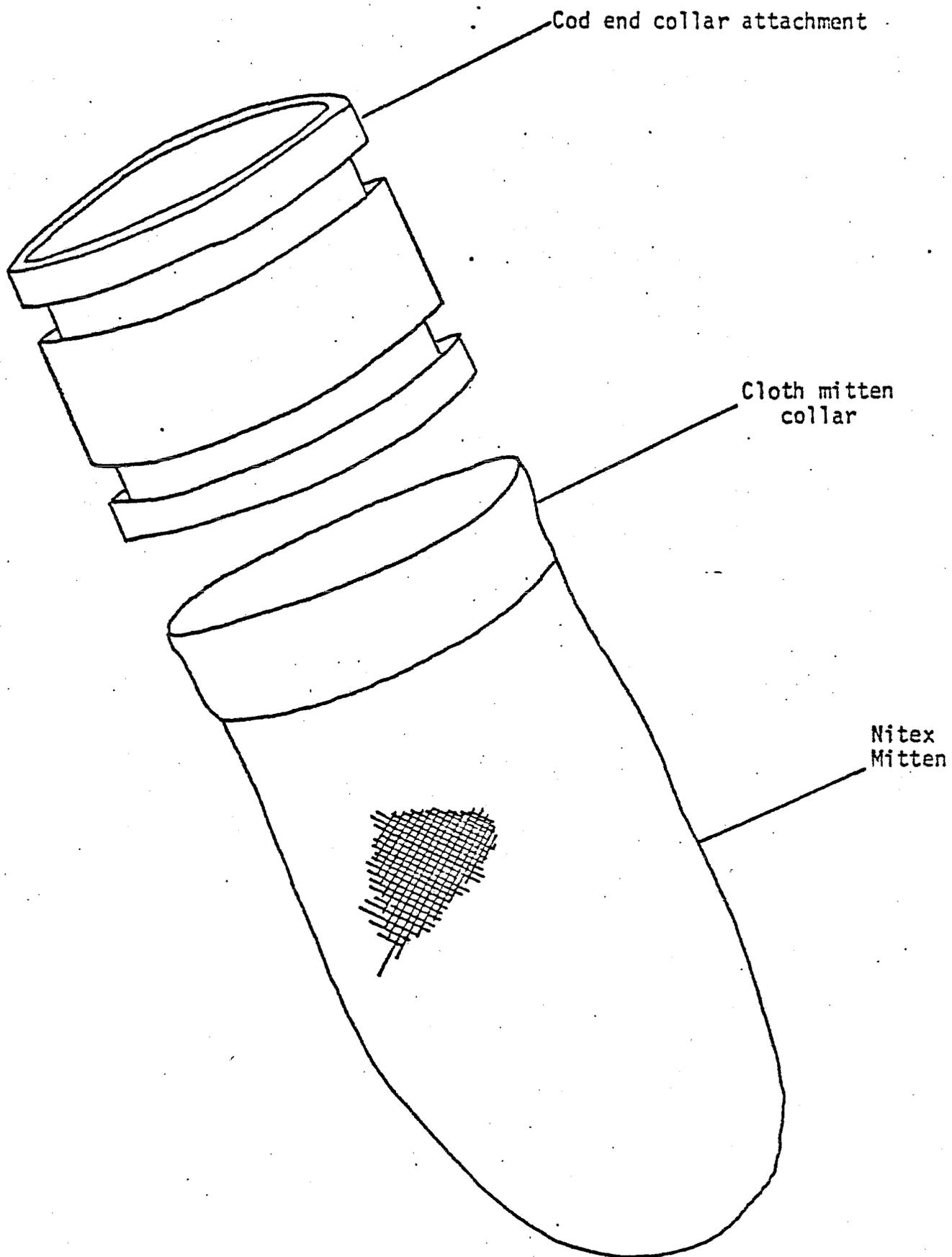


Figure 5. Suggested modification of design for a better bucket

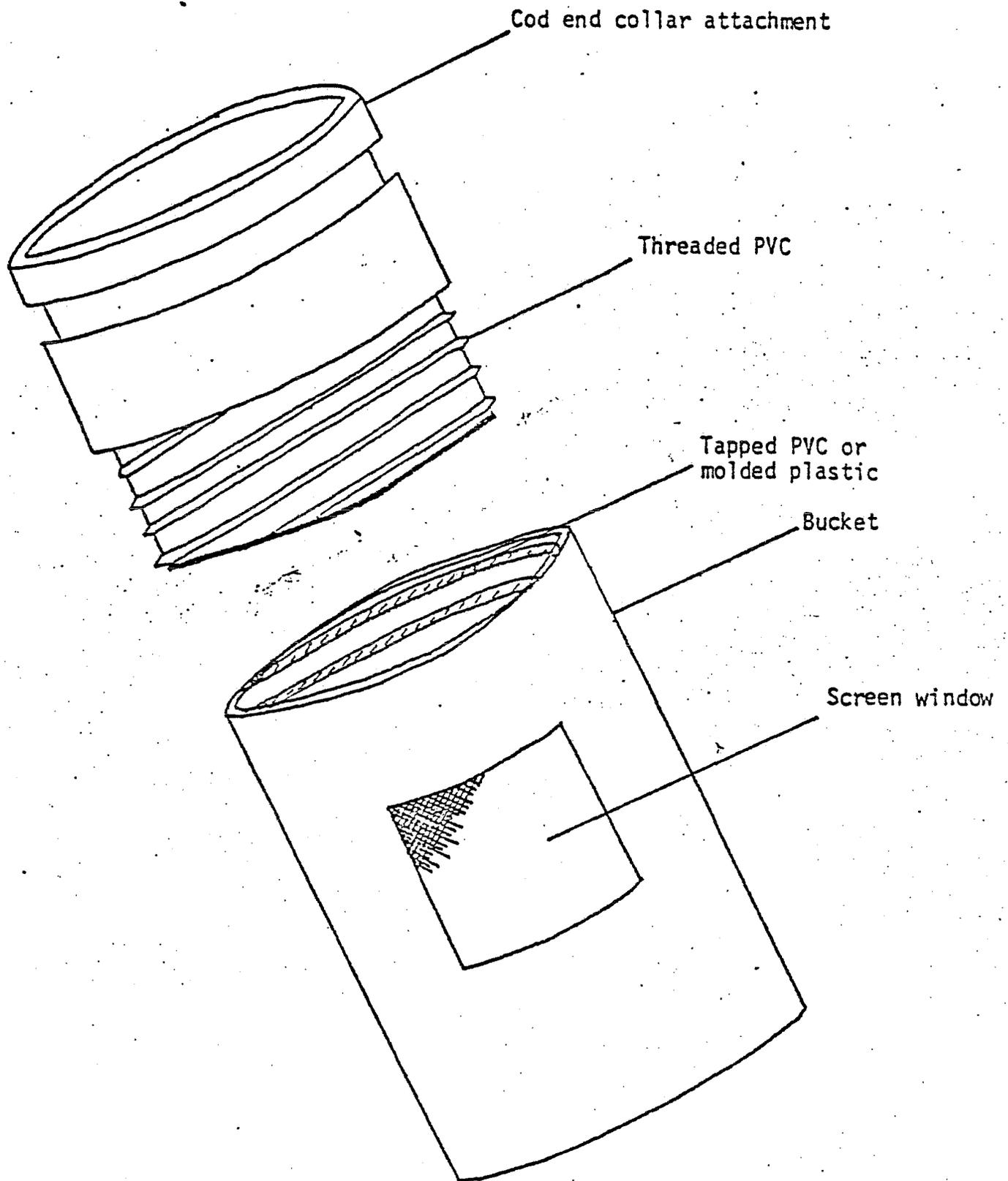


Figure 4. Clip fastener type cod end

