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CARDI
CARIBBEAN AGRICULTURAL RESEARCH AND DEVELOPMENT INSTITUTE

Factsheet

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HAND HAY BALER

(DESIGN AND OPERATION)

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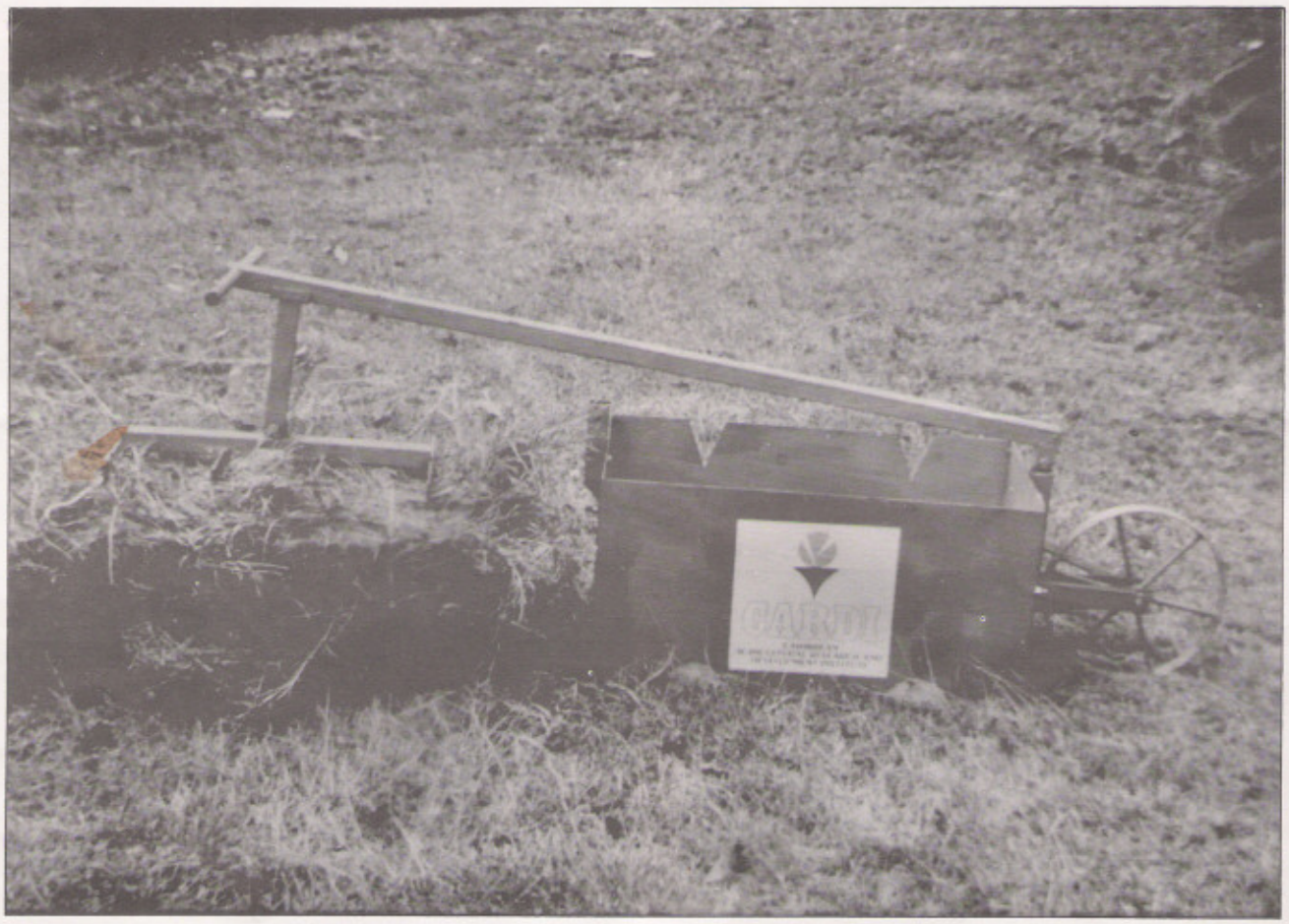

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HAY BALER

In an effort to help small farmers preserve forages to feed their animals during the dry season agricultural scientists have developed various types of hand operated hay balers. Some of these performed quite well, but invariably they had one or more unsatisfactory details especially the complexity of construction and instability during operation.

With funding from FAO, CARDI commissioned Carib Agro-Industries Ltd. (CAIL) in 1985 to design and manufacture a prototype for testing in Caricom states. The baler was manufactured and 30 were shipped throughout the region for on-farm testing. The number of requests for additional information on the baler has exceeded all expectations. As a result CARDI has published this Factsheet which describes the machine and gives sufficient detail to enable it to be built by any reasonably well-equipped workshop.

OPERATION

Before the hay is loaded into the rectangular chamber, two strings are placed across it as shown in Fig. 2. To save costs, these strings can be made from the discarded string used for conventional bales. Each string has a loop in one end, which hangs just outside the V notches.

Fig. 1. *Ready to make a bale of hay.*

Fig. 2. *Strings put across chamber. Loops hang just outside V-notch.*

Hay is now pushed into the chamber until it is as full as possible - say 12 - 15 cm (5 - 6 in) above the edge.

Fig. 3. *Keep loading hay until about 12 - 15 cm (5 - 6 in) above chamber edge.*

The free end of each string is brought over the hay and pushed through the loop. No attempt is made to tighten the strings at this stage.

The pressing frame is now rested on top of the hay and the handle brought up and over to rest in the cradle of the pressing frame.

Fig. 4. *Pressing Frame placed on top, handle placed into cradle of pressing frame...*

Fig. 5. *...and pushed down*

One man pushes down on the handle whilst his colleague pulls the strings tight through the loops and secures them behind each loop with a quick-release knot.

Fig. 6. *The string are pulled tight through the loops and secured with quick-released knots.*

The handle is returned to its position beside the chamber and the pressing frame lifted away.

The bale is now lifted from the chamber by grasping the strings. At the same time the man puts the toe of each shoe in the holes at the bottom of the chamber.

This added weight , plus the slightly tapered side of the chamber, ensures that the bale lifts out easily, even after the heaviest pressing.

Fig. 7. *Toes put into holes at bottom of the chamber and bale lifted out.*

If a one man operation is required, the handle retaining lugs can be extended upwards with a series of holes and a pin can be slipped into the appropriate hole when the handle is pushed down. This holds the handle in position whilst the bale is tied.

To move the unit from place to place, the handle is retained between the lugs as shown in Fig. 1. The unit then becomes a simple wheel barrow.

CONSTRUCTION

The key element is the tapered chamber with two notches on the left hand side and toe-holes on both sides at the bottom. Approximate dimensions are as shown overleaf Fig. 8., but can be varied to suit available sheet sizes, string lengths, etc.

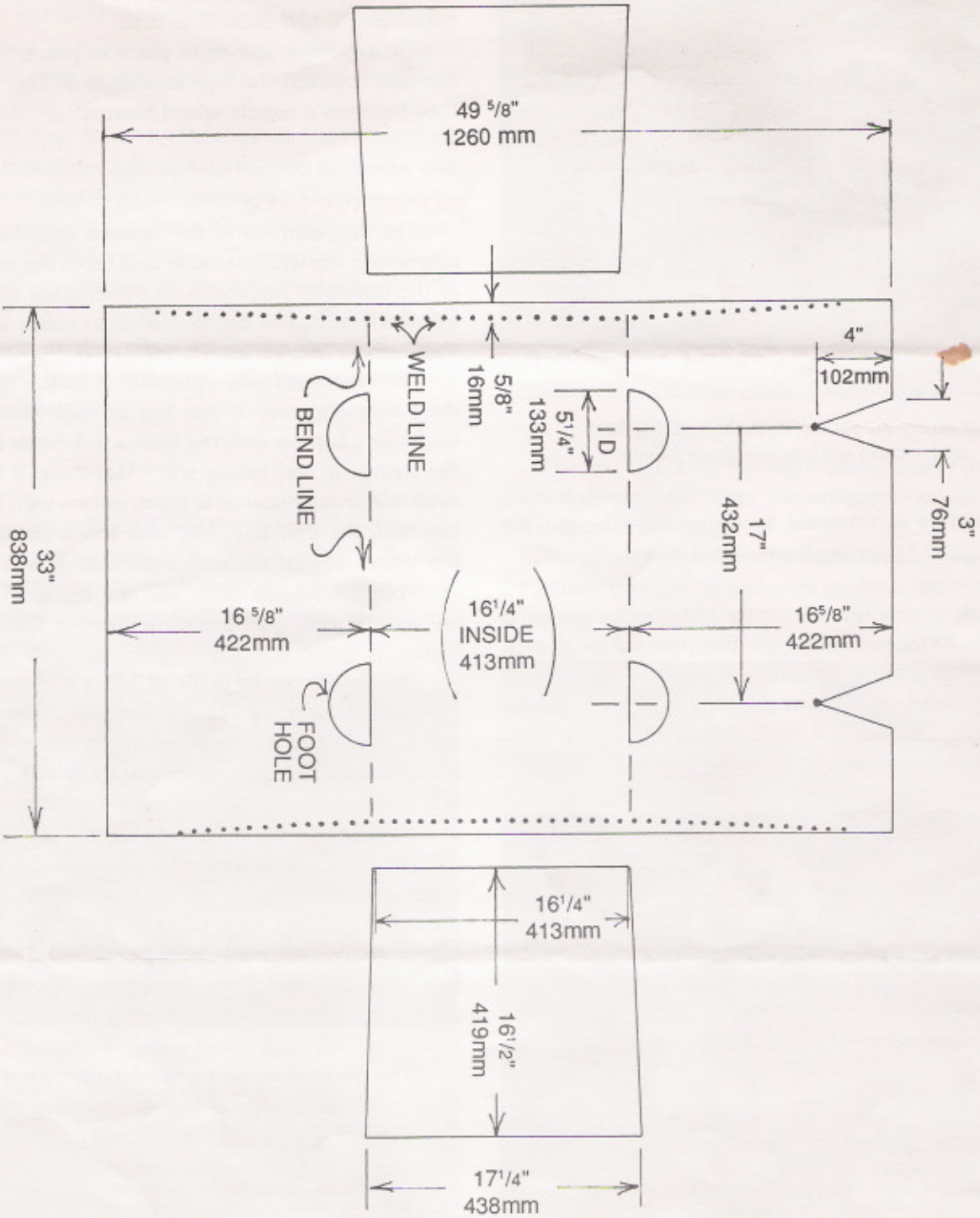
The wheel is really optional. It makes movement to the baling site easy if one has to walk there, and it is useful as a barrow to bring back a sick lamb and to carry the strings to the baling site. However, if transport is available or the distance is short, or two men are working together, the unit is lighter and much cheaper without the wheel. Since the unit shown here was developed, shop-bought wheels have become easily available and are recommended as probably cheaper than fabricating them.

The handle can be made of 3·75 x 3·75 cm or 5 x 5 cm (1·5 in x 1·5 in, or 2 x 2 in) RHS or pipe. The captive end can be made as a telescope, or can be based on a slotted arrangement. The principal is that the handle pivot should swing to the side for loading and to the centre for pressing and travelling.

The pressing frame can likewise be made with various details. The one shown here 57·5 cm long x 35 cm wide and 32·5 cm high (23 x 14 x 13 in). The vertical unit is slightly pivoted on the bottom by using a slack bolt. This allows for the change in angle as the handle moves downwards with increasing pressure.

*The dimensions and most details are not critical, but if an exact specification and engineering drawings are required, CAIL will be glad to supply them for a modest fee.

FIG. 8. LAYOUT OF THE CHAMBER



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