

# A DESCRIPTION OF APPARATUS FOR WEIGHING CANE ON EXPERIMENTAL PLOTS.

By

J. L. LINTNER, Ing. Tech. d'Agri., Agricultural Adviser, S.A. Potash Co. (Pty.), Ltd.  
and S. M. MARITZ, R.T.C. Dip.Glas.

With improvements in experimental technique enabling greater complexity of design, very often large areas are involved especially when higher order interactions are being sought as well as main effects.

Co-operative experiments away from an organised research centre require carefully thought-out plans of action for smooth and efficient handling, if the general farm routine is not to be disorganised.

One of the principal problems in connection with cane experiments is weighing the material in the field at harvest time. This operation is a most laborious one, and more apt than anything else connected with co-operative field experiments to dislocate the general routine work of farm labour. When designing a piece of weighing apparatus, one also must remember to evolve something the handling of which does not present difficulties to labour which is totally unskilled in this type of work.

Although several satisfactory methods of weighing can be and have been devised for use at Research Institutions, where all equipment is utilised on the spot, apparatus for use in connection with co-operative field experiments, which are often located in inaccessible parts of the sugar belt, necessitates machinery which can be easily handled and transported rapidly from one centre to another without loss of time due to unwieldiness. The Agricultural Department of the S.A. Potash Co. (Pty.), Ltd., first utilised a metal frame which was used in conjunction with a wooden tripod and spring scale weighing up to 500 lb. Fig. 1 shows the measurements of this frame.

It was found that it was quicker to weigh small bundles rather than load the frame to full capacity, this due to difficulties in off-loading. This resulted in the load carried by each labourer engaged in the work being weighed separately, and the cane being pulled off from the opposite side immediately the weight had been registered. This method enabled 11 carriers to keep pace with about 21 cutters with a crop involving about 35 tons per acre. The bottom of the frame was raised to about 3ft. to 3½ ft. from the ground.

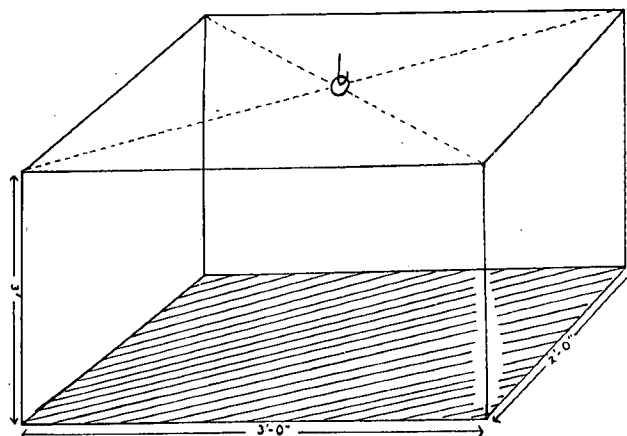


FIG. 1.

Material used.—1¼ in. x 1¼ in. angle iron, the whole being collapsible and held together with 5/16 in. bolts and wing nuts. Suspension from the scale hook by a metal ring attached to four chains.

The upright side pieces proved a hindrance when twisted cane was involved, and so a different design was adopted, as shown in Figure 2.

For both these frames a piece of stout canvas was lashed to the bottom so as to prevent any short pieces of cane present from falling to the ground. Although weighing by this method was a great improvement over what had been done until then, and is probably ideal for very small experiments, still it was found that this method was not fast enough to deal with fairly large experimental areas, principally due to loss of time involved moving the tripod, which is necessary so as to ensure minimum and constant carrying distances. The cost of the frames was approximately £4 each.

At Potchefstroom College of Agriculture a piece of apparatus was evolved for weighing stover in the field, and it is a modification of this that was finally adopted for trial on cane plots. This took the shape of a portable jib. Fig. 3 used in conjunction with a sling, Fig. 4. The cost of this jib was approximately £9, and the slings about £3. 5s. 0d. each.

The apparatus consists principally of a pair of wheels, axle, vertical post, jib and handling boom.

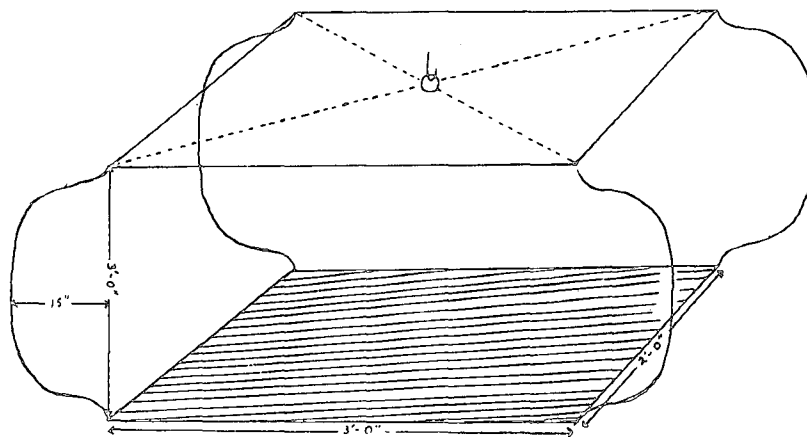
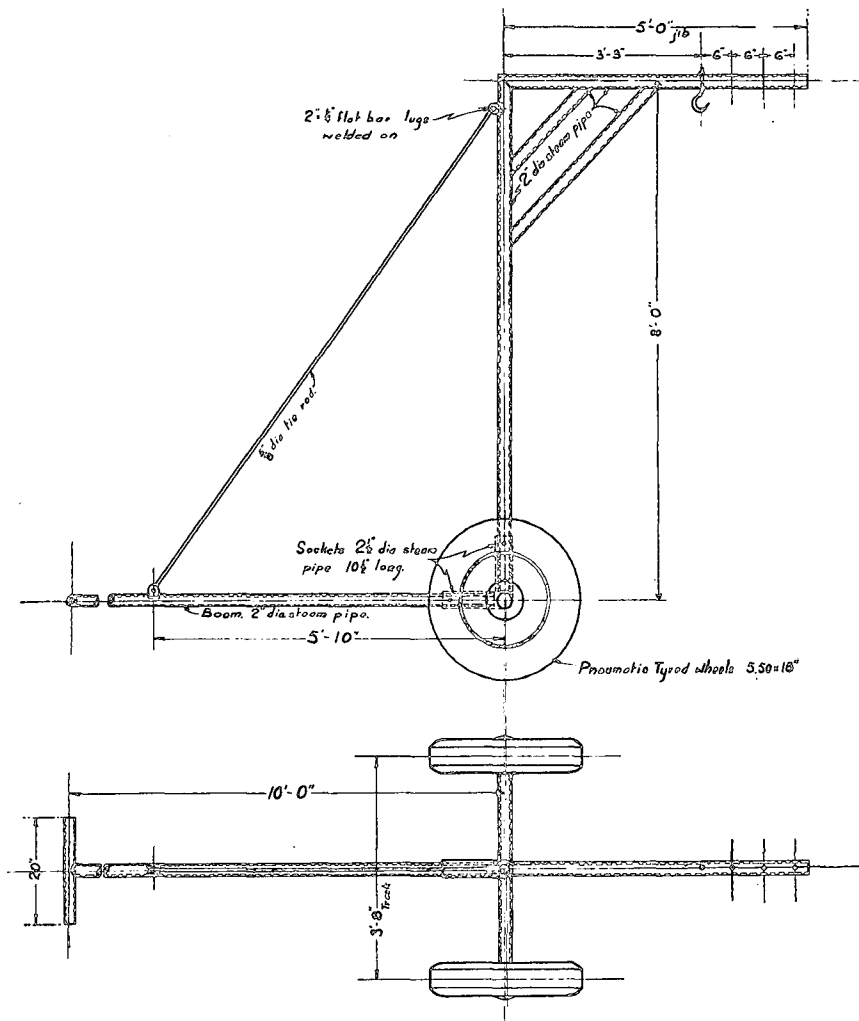


FIG. 2.

Same material used as described in Fig. 1. Corner pieces given a sweep 15in. from straight.



### Portable Weighing Jib.

FIG. 3 .

Portable jib showing design and measurements.

An old motor car front axle and wheels were obtained, and the stub axles cut off and welded into 2in. diameter piping, giving a track of 3ft. 8in. (it was found in practice on the sloping ground of hill sides that a minimum track of 4ft. 6in. is desirable).

To the centre of the tube axle were welded at right angles to each other, two pieces of  $2\frac{1}{2}$  in. diameter piping 10 $\frac{1}{2}$ in. long, and into these fitted the vertical post and handling boom respectively, which were of 2in. diameter piping.

The vertical post was about 8ft., and to it, at the top, was welded the jib of 2in. diameter piping 5ft. long.

The handling boom was 10ft. long, and carried a pulling cross bar 20in. long, also welded. This cross bar was found to be a little inadequate in practice, and should be at least 36in. long.

The boom and vertical post had flat iron lugs welded to them and a tension tie bar was fitted between these lugs, and so triangulated the two members, thus keeping them rigid. It was found that by tipping the handling boom into the air the "slingful" of cane could be easily attached to the now lowered scale hook on the jib. A downward pull on the handle suspends the bundle of cane, and the scale reading can be taken.

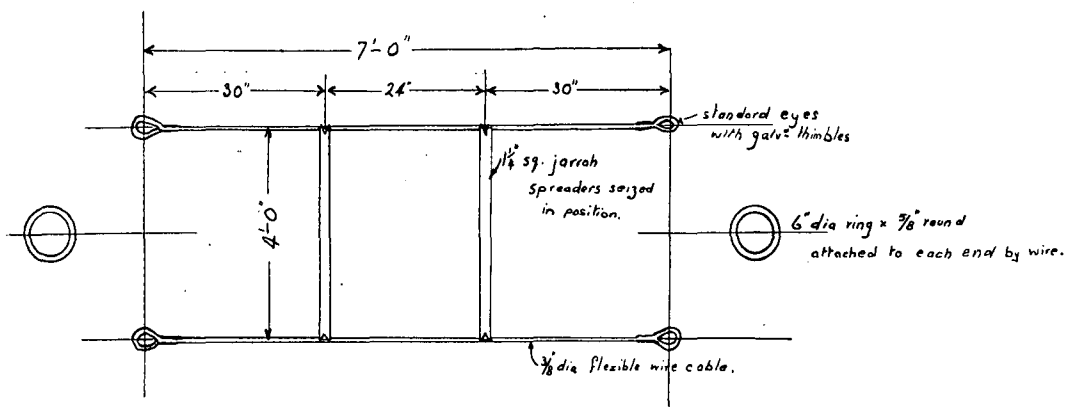


FIG. 4.

Sling on to which cane is loaded for weighing.

A short strut of the same size piping 21in. long was welded across the corner of the jib and vertical post to give rigidity. This strut was kept short with a view to giving the maximum clearance to the bundle of cane being weighed, but it was found in operation that the jib was insufficiently rigid, and a longer strut, about 43in., was added.

The jib had four holes drilled through it parallel to the axis of the vertical post. The first hole was 3ft. 3in. from the post, and the others at 6in. pitch therefrom. These holes were for receiving the hook to which the scale and bundle of cane were attached and provided adjustment for the clearance from the post and ground.

This method was found to be quicker than any other scheme which involved lifting or hauling a bundle of cane up and exceeded the efficiency of the frames described above.

Throughout a 500 lb. spring scale was used and found to be quite satisfactory, Fig. 5.

From work done to date it appears as though this method of weighing is most satisfactory. It requires about five labourers to handle the apparatus, about four slings, and six to ten carriers. It is possible to weigh about 80 to 90 tons or more per diem if no time is lost.

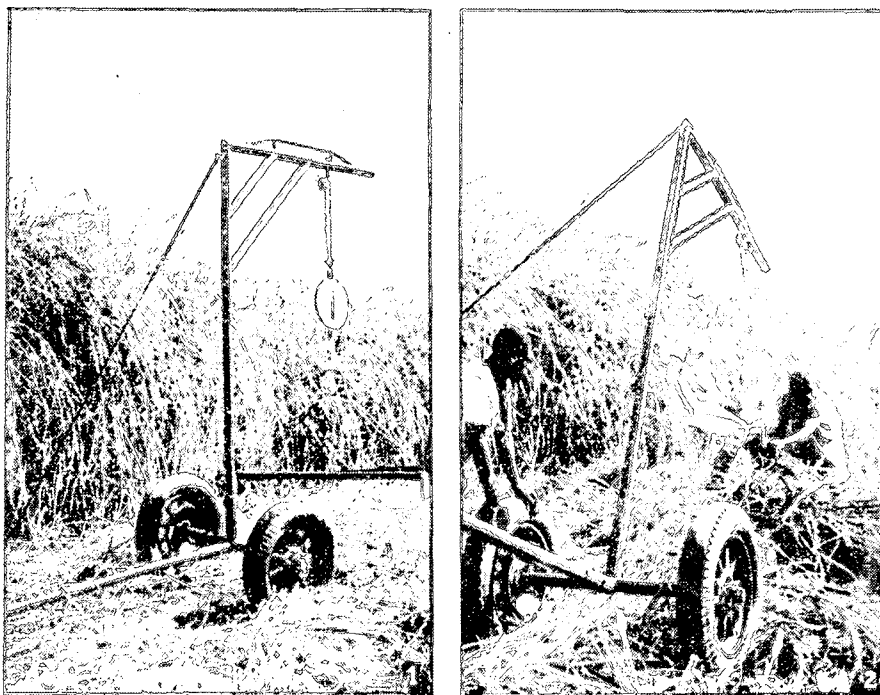


FIG. 5.

Weighing experimental cane with a portable jib in the field.

The PRESIDENT congratulated Mr. Lintner on his design of this useful piece of apparatus. It was a most useful time-saver, apparently.

Mr. DODDS said that the apparatus had been lent to the Experiment Station, with very successful results ' a variety trial could be reaped much more rapidly than had hitherto been possible.

Mr. COLEPEPPER had used this apparatus in his work and found that it saved time and patience.

Before he had this machine a great deal of time had to be taken up teaching the natives on each farm he went to the work required for the reaping of fertilizer and variety trials. Now after half-an-hour's coaching the job could be started on and went smoothly right to the end.

Mr. Lintner was accorded a hearty vote of thanks for his idea and for the paper.