DESCRIPTION OF APPARATUS

The experimental work is carried out on a conveyor of the variable adherence force type, equipped with a positive direct drive.

Fig. 1 shows schematically the arrangement of the main components of the apparatus consisting of a main frame supporting the trough, the hopper and the driving unit. Photographic details of the conveyor and its instrumentation are shown in Figs. 2, 3 and 4, and the adjustable eccentric in Fig. 5.

The main frame is composed of welded steel angles with flats uppermost. It can be divided into two parts, one supporting the trough and the hopper, and the other the drive unit. The former part is machined so that the upper surface is sufficiently smooth for sliding and the inner edges are parallel to the longitudinal centre line. On the latter part, the frame is fitted with two steel sheets, one as the foundation plate of the eccentric shaft and the other as that of the electric motor. The upper surfaces of these plates are machined and drilled already for mounting the drive unit.

The trough is made of aluminium sheet which is bent into the shape of a channel with a flange on both edges throughout the trough length. Its inside cross-section is rectangular, 1 inch deep and 3 inches broad. In order to provide an effective length of 24 inches, the trough is made

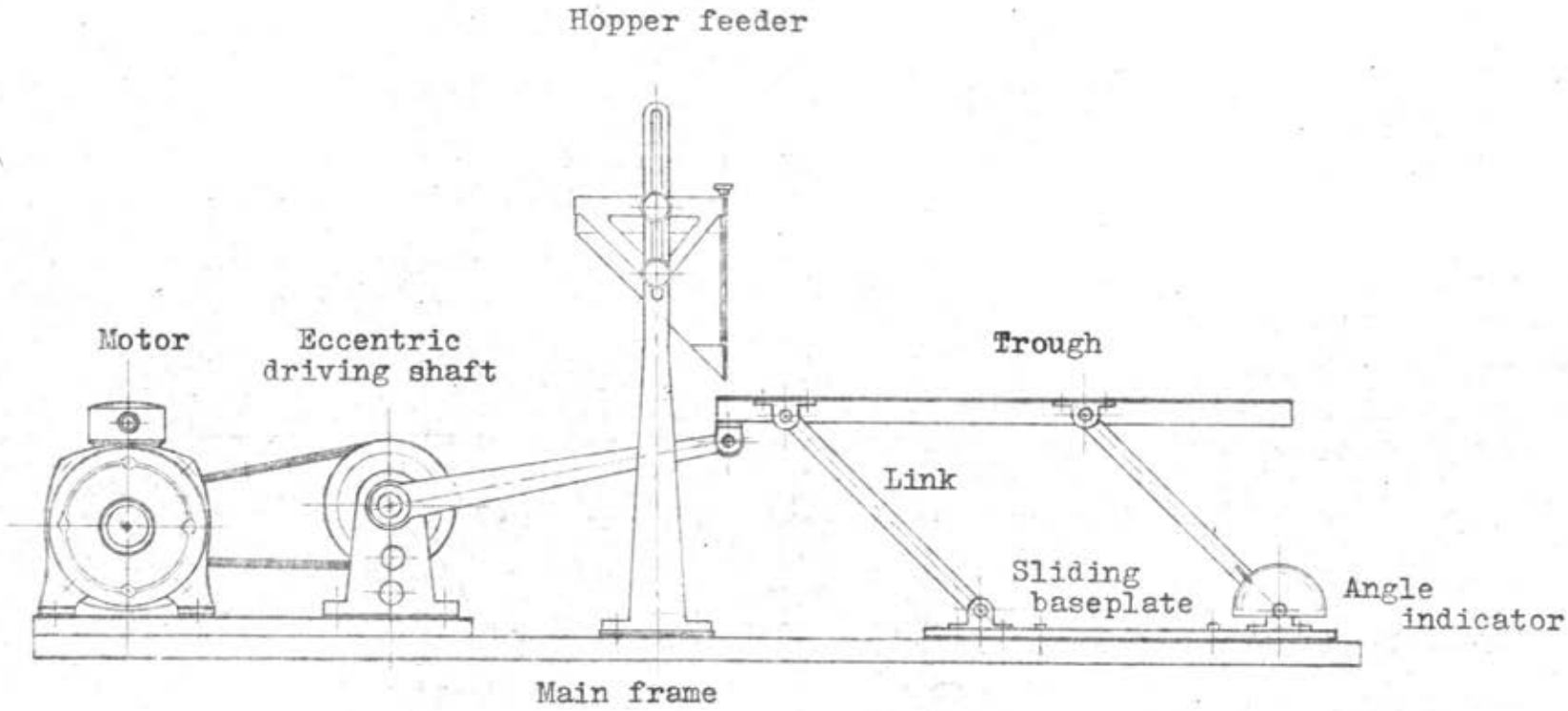

Fig.1 Arrangement of the main components of the apparatus.

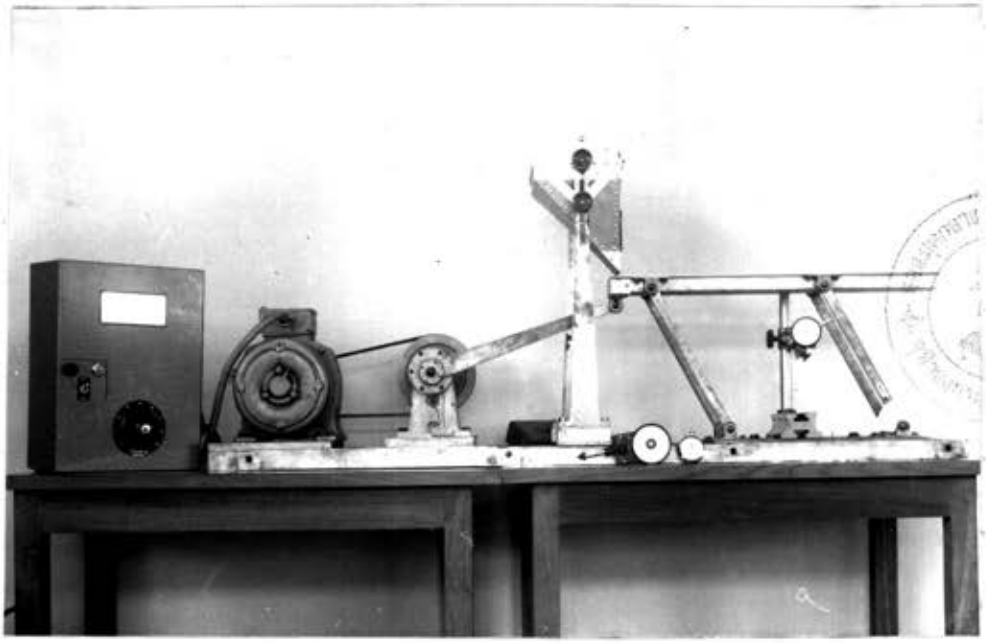

Fig. 2 The conveyor and its instrumentation.

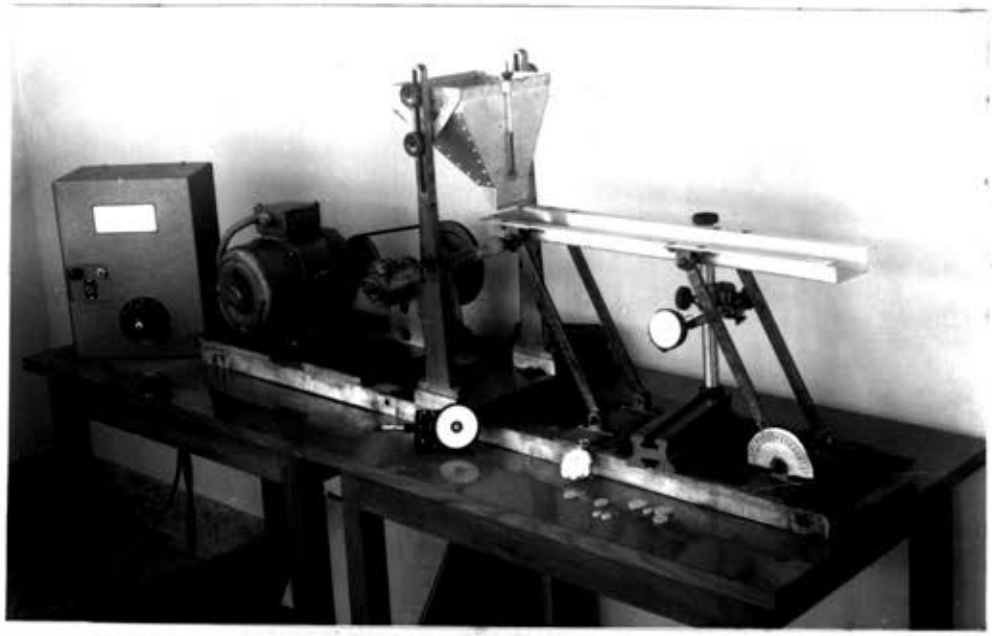

Fig. 3 General view of apparatus.

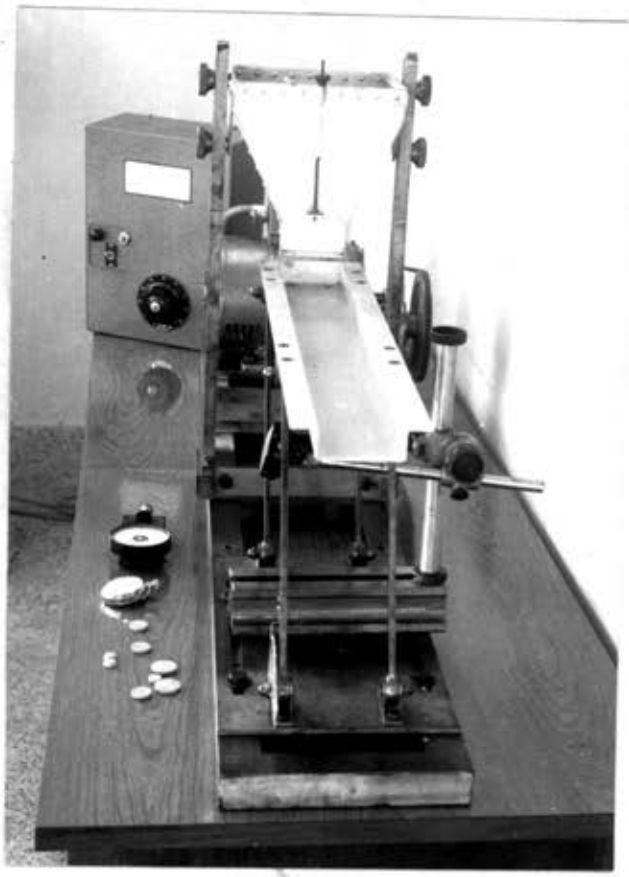

Fig. 4 Front view of apparatus.

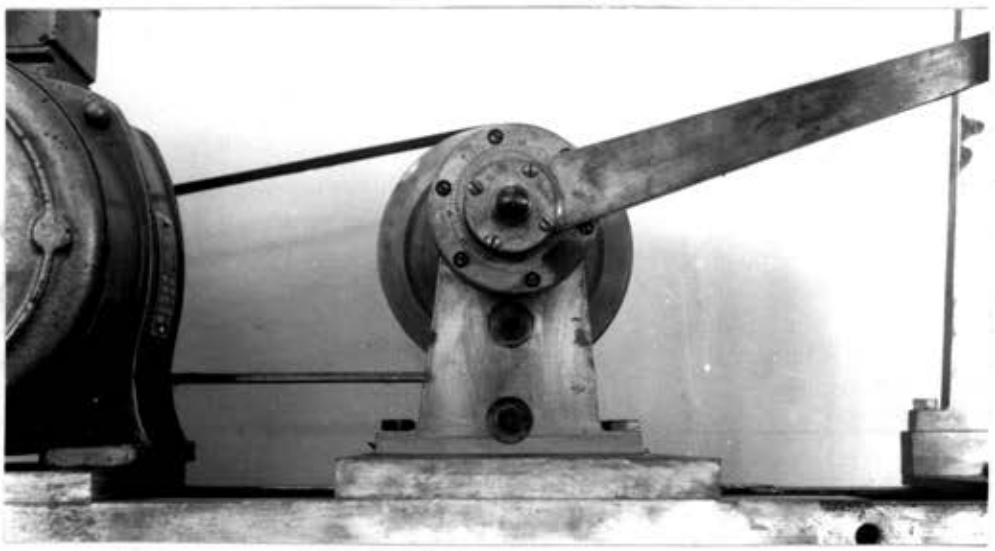

Fig. 5 The adjustable eccentric unit.

25 inches long. The discharge end of the trough is open while the other end is closed in order to keep the material within the trough. The trough is supported by four links having bearings at each end and placed on the base plate. The centre distance between both eyes of supporting link is 12 inches. Brass bushings are inserted into all the link eyes. Two long slots parallel to each other and also to the centre line of the trough are positioned near both edges of the sliding base plate. Through these slots the base plate is fitted to the main frame by four setscrews, and slides longitudinally when unscrewed. To ensure that the base plate slides without lateral movement, two shoulders are machined on the base plate parallel to the trough centre line. With this arrangement the variation of the angle of inclination α is accomplished entirely by sliding the base plate because the drive unit is fixed. The angle indicator fitted on the right front supporting leg of the trough shows the angle of inclination at any time.

The drive unit consists of a 0.33 H.P. D.C. motor controlled by a Variac. This gives a speed range of 0 - 1200 rpm to the double eccentric while is driven from the motor by a Vee-belt. Rotation of this eccentric when unclamped varies the effective crank radius and hence the amplitude of motion of the conveyor. A scale is provided so that this can be read off directly. Final setting of the amplitude is carried out using a dial test indicator which is arranged

with its axis at right angle to the trough support links and with its plunger tip in contact with one of the hinge pins at the top of the links.

Thus the link inclination α, trough amplitude a and the vibration frequency N can all be easily varied between quite wide limits.

The hopper feeder for sand is made of aluminium in order to match the trough, and is fitted on a steel frame. An opening is placed at the bottom of the hopper and faces to the trough. It has a sliding gate, 3 inches wide and maximum opening of $\frac{1}{2}$ inch, which is fitted with a device for fine adjustment of opening. The hopper is supported by two posts on a sliding baseplate placed on the main frame. With slots on the upper end of the supporting posts and a sliding baseplate, the hopper can be adjusted to be suitable for feeding the trough, wherever the trough is positioned.