

A Useful Crane Mechanism

Load Remains at same Level as Jib is Raised

IN the ordinary type of crane a considerable amount of power is necessary to raise the jib on account of its weight and the effect of the load. How the load affects the operation may be easily demonstrated by means of a Meccano crane. If the jib is luffed in with the hoisting barrel "braked," the load will be found to rise also, so that power has to be expended in lifting the load as well as in lifting the dead-weight of the jib. In practice this means a heavy increase in running costs, especially in the case of cranes engaged in the handling of ships' cargoes, where it is necessary to luff the jib almost continuously.

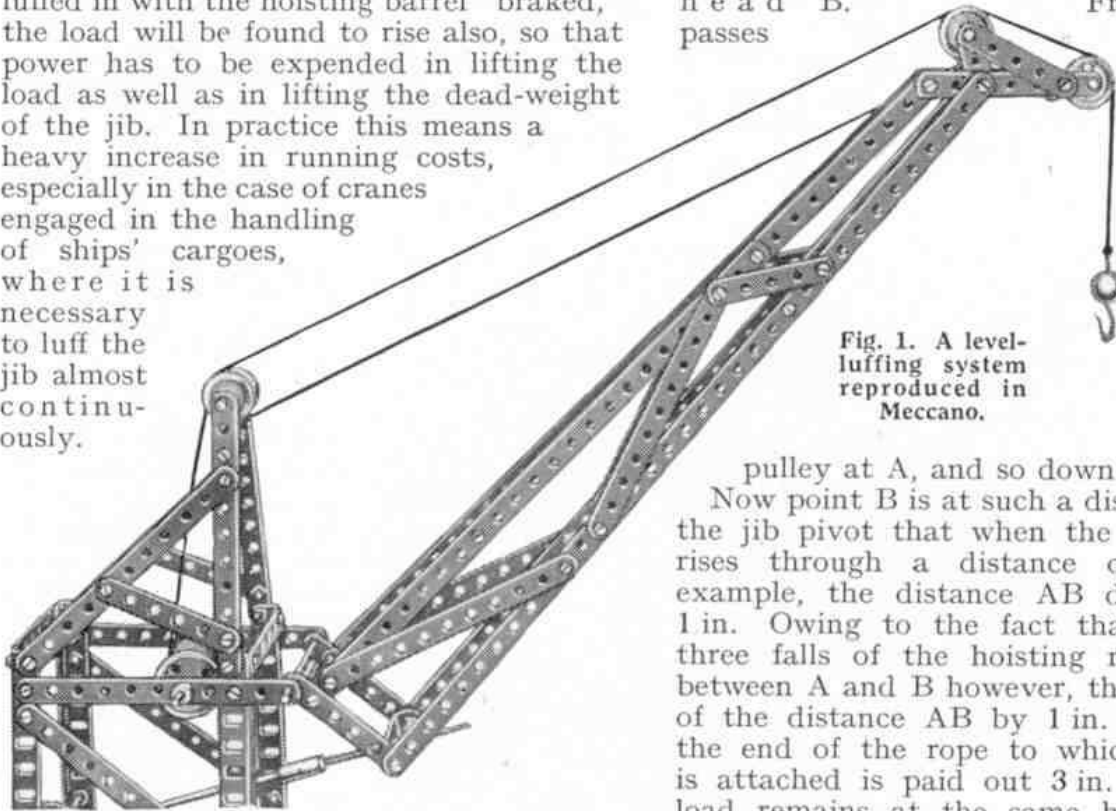


Fig. 1. A level-luffing system reproduced in Meccano.

In order to reduce this wastage of power as much as possible many cranes are now fitted with balanced jibs and what is known as level-luffing gear. The balanced jib gets over the difficulty of the dead-weight of the jib, and the level-luffing gear counteracts the effect of the load. It does this by making the crane hook remain always at the same height above the ground whilst the jib is being luffed. As a result the luffing motor only has to overcome friction, and therefore it can be of much lower power than would be necessary with an ordinary crane. Also it makes for safer handling of loads, as the crane driver can move a load with a much clearer idea of its path when it follows a horizontal course instead of a constantly varying one.

One of the simplest level-luffing systems for incorporation in a Meccano model is the Toplis, which is reproduced in the Meccano construction shown in Fig. 1.

In order to make the principle and operation of the mechanism quite clear we also show in Fig. 2 a line drawing of the layout of the level-luffing gear arrangement. The hoisting rope passes up from the hoist barrel to a pulley in the superstructure head B.

From here it passes round one of the pulleys at the jib head A, then back round the remaining pulley at B, and finally is taken over the second pulley at A, and so down to the load.

Now point B is at such a distance above the jib pivot that when the jib head A rises through a distance of 3 in. for example, the distance AB decreases by 1 in. Owing to the fact that there are three falls of the hoisting rope passing between A and B however, the shortening of the distance AB by 1 in. means that the end of the rope to which the hook is attached is paid out 3 in. Hence the load remains at the same height above the ground throughout the entire luffing range.

In a large crane, handling very heavy loads, the saving in power consumption through this feature is quite considerable.

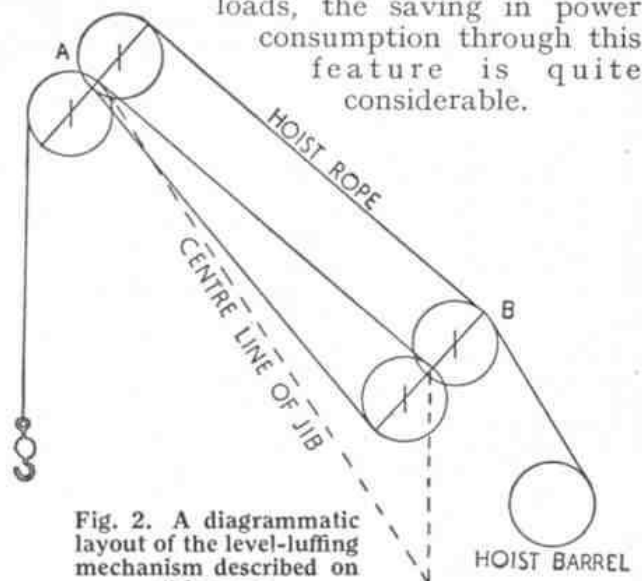


Fig. 2. A diagrammatic layout of the level-luffing mechanism described on this page.