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㉗ **Separator.**

㉗ A separating apparatus comprises an inclined, perforated table (12, 13) on to which a mixture to be separated is deposited. Means, for example an electric motor, are provided for imparting to the table an elliptical motion having a component in the vertical plane. Means are also provided for selectively altering the angle of inclination of the table according to the nature of the mixture to be separated. The latter is preferably operable while the table is in use so that fine adjustments can be carried out by the operator in accordance with the nature of the mixture being separated at any given time.

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SEPARATOR

This invention relates to an apparatus for separating mixtures, in particular garbage mixtures, having components of high and low density.

In the treatment of waste products, for example, 5 industrial waste, domestic rubbish, or other forms of garbage, it is desirable to be able to separate certain components. For example ferrous metals may be separated by electro-magnetic means. Such separation may serve two purposes, firstly the separated material might have some 10 value in its own right, and secondly it may be necessary to remove certain material so as to prevent or minimise damage to subsequent processing apparatus.

A large proportion of garbage consists of paper, plastics, and other combustible materials. This fraction can be 15 separated and, compacted or pelletised, it forms a useful industrial fuel. However, machinery for compacting, pelletising, or forming this matter into briquettes is expensive and is sensitive to the presence of hard bodies such as metal, pieces of glass and the like.

20 Our published UK patent application No. 2109707 discloses

a separating apparatus which comprises an inclined perforated table on to which the mixture to be separated may be deposited, and means for imparting to the table a motion having a component in the vertical plane.

5 The invention seeks to provide an improved form of apparatus of the above type.

According to the present invention there is provided a separating apparatus which comprises an inclined
10 perforated table, on to which the mixture to be separated may be deposited, means for imparting to the table an elliptical motion having a component in the vertical plane, and means for selectively altering the angle of inclination of the table according to the nature of the
15 mixture to be separated.

It has been found that the degree of separation of a given mixture is critically affected by the angle of inclination of the perforated table to the horizontal and the optimum angle varies according to the nature of the mixture being
20 separated. In a preferred form of the present invention the upper end of the inclined table is supported by rocking arms pivotally attached to a fixed support, and the length of the arms is adjustable, preferably by means of hydraulic actuators or electrohydraulic arms. Such
25 adjustments may be carried out while the apparatus is in

use and thus the operator can continuously monitor the separation and adjust the inclination of the table to suit the observed separation rate.

At its lower end the table is preferably mounted on a support in turn mounted on a shaft driven by an eccentric drive from a motor, for example a suitable electric motor. This imparts to the table an elliptical motion in the vertical plane, and the major axis of the ellipse progressively tilts at points up the table until, near the top thereof, the major axis of the ellipse is parallel with the table and the minor axis is small in relation to the major axis. By this means the drive mechanism is simplified and the cost of the apparatus may be kept down.

The invention will be described further, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a side elevational view of an apparatus constructed in accordance with the invention; and

Figure 2 is an end elevational view corresponding to figure 1.

Referring to the drawings, the apparatus depicted is generally described in our above application 2109707 and comprises perforated tables 12, 13 mounted one above the

other and inclined at approximately 18° to the horizontal. The tables 12, 13 are supported at their lower end on bracket 14 in turn mounted on a shaft 16 eccentrically driven by a drive 18 connected by a chain or belt 20 to an electric motor 22. The eccentric 18 includes a counter-balance weight 24 to counter-balance the weight of the tables acting through the shaft 16. A similar, non-driven, eccentric 18 and counter-balance weight 24 is positioned at the opposite end of the shaft 16. The form of motion of the table is illustrated by the three ellipses immediately above table 13 in figure 1.

At their upper end tables 12, 13 are supported on a pair of swinging arms 26 pivotally attached to a table support frame 28 at 30. At their upper ends the arms 26 are mounted on a shaft 32 pivoted to the machine frame at 34. The upper ends of the arms 26 are not directly attached to the rotatable shaft 32 but instead are contained in mechanical or hydraulic actuators 36 capable of adjusting the length thereof. The actuators may be those known as 'jacktuators' and may be driven by a suitable drive 38 from a central geared motor 40, or may have direct hydraulic drive to each actuator 36. In either event care is taken to see that adjustment of each actuator 36 is equivalent to the other so that each side of the table is at exactly the same height.

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In use, material to be separated is placed on the upper table 13 approximately one-third of the way up as indicated by arrow A in figure 1. The motor is switched on and the tables set in motion causing heavy material to fall down and the lighter material to move upwardly. The perforations in table 13 may be coarser than those in table 12 so that a second similar separation takes place in the lower table 12 of the finer components which have fallen through the mesh of the upper table 13. A chute 42 is placed beneath the lower table 12 to catch fine particles passing through the smaller mesh of that table. Appropriate ducting may be placed at the upper and lower ends of the tables 12, 13 and the chute 42 in order to catch the various separated fractions.

The nominal inclination of the tables 12, 13 is 18° but, by remote actuation by the table operator of the actuators 36 this can be varied within limits of, in the present case, between $13.1/4^{\circ}$ to $22.1/4^{\circ}$ giving the operator a wide degree of control of the table inclination. The inclination can be adjusted while the apparatus is in motion allowing the operator directly to observe the separation and adjust the table inclination accordingly to obtain optimum results for a given mixture. Should the nature of the mixture change, the operator can make appropriate adjustments to the table inclination to suit the new conditions.

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The motor 22 preferable incorporates a torque and speed control allowing full control of the speed of oscillation of the tables. This, in conjunction with the adjustment of the inclination, gives the operator very fine control
5 over the separating action. The actual controls may be close to the machine or may be remote therefrom, for example in a centralised control room.

The construction of the tables 12, 13 and associated support frame 28 are preferably such as to be as light as
10 possible, and may be formed of metals such as aluminium or indeed even from plastics materials in whole or in part.

The apparatus may be fed by a suitable conveyor, e.g. a belt feeder preferably extending across the width of the table. This may incorporate a surge hopper to even out
15 fluctuating loads of feed-stock.

CLAIMS

1. A separating apparatus which comprises an inclined perforated table on to which the mixture to be separated may be deposited, and means for imparting to the table an elliptical motion having a component in the vertical plane
5 characterised in that means are provided for selectively altering the angle of inclination of the table according to the nature of mixture to be separated.
2. An apparatus as claimed in claim 1 in which the upper end of the inclined table is supported by rocking
10 arms pivotally attached to a fixed support and the length of the arms is adjustable.
3. An apparatus as claimed in claim 2 in which the adjustment is carried out by means of hydraulic actuators or electrohydraulic arms.
- 15 4. An apparatus as claimed in any one of claims 1 to 3 in which the lower end of the table is mounted on the support in turn mounted on the shaft driven by an eccentric drive from a motor.
5. An apparatus as claimed in claim 4 in which the
20 motor is an electric motor.

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6. An apparatus as claimed in any one of claims 1 to 5 in which two perforated tables mounted one above the other and substantially parallel to one another are provided.

7. An apparatus as claimed in claim 6 in which the
5 perforations in the upper table are coarser than those in the lower table.

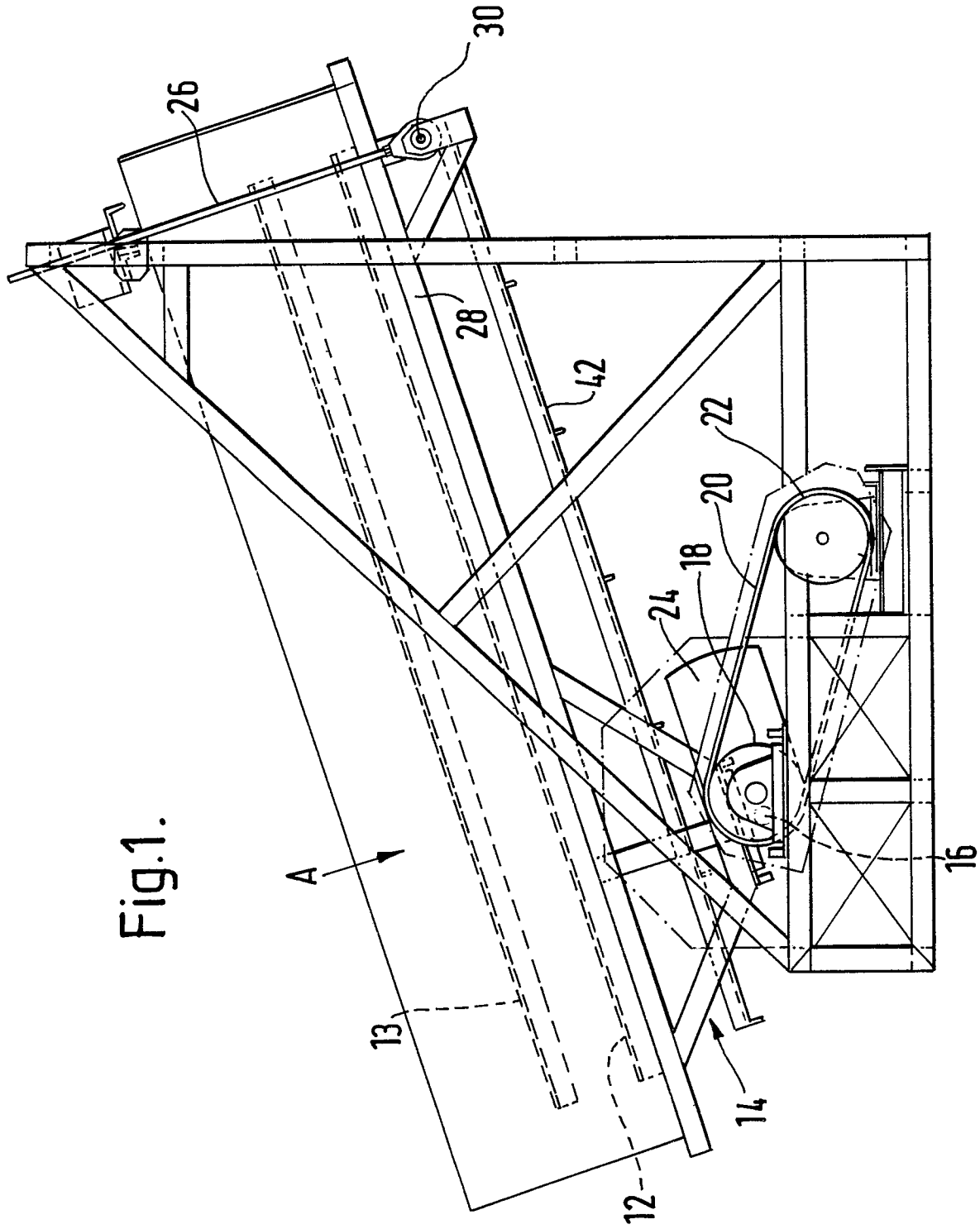


Fig.1.

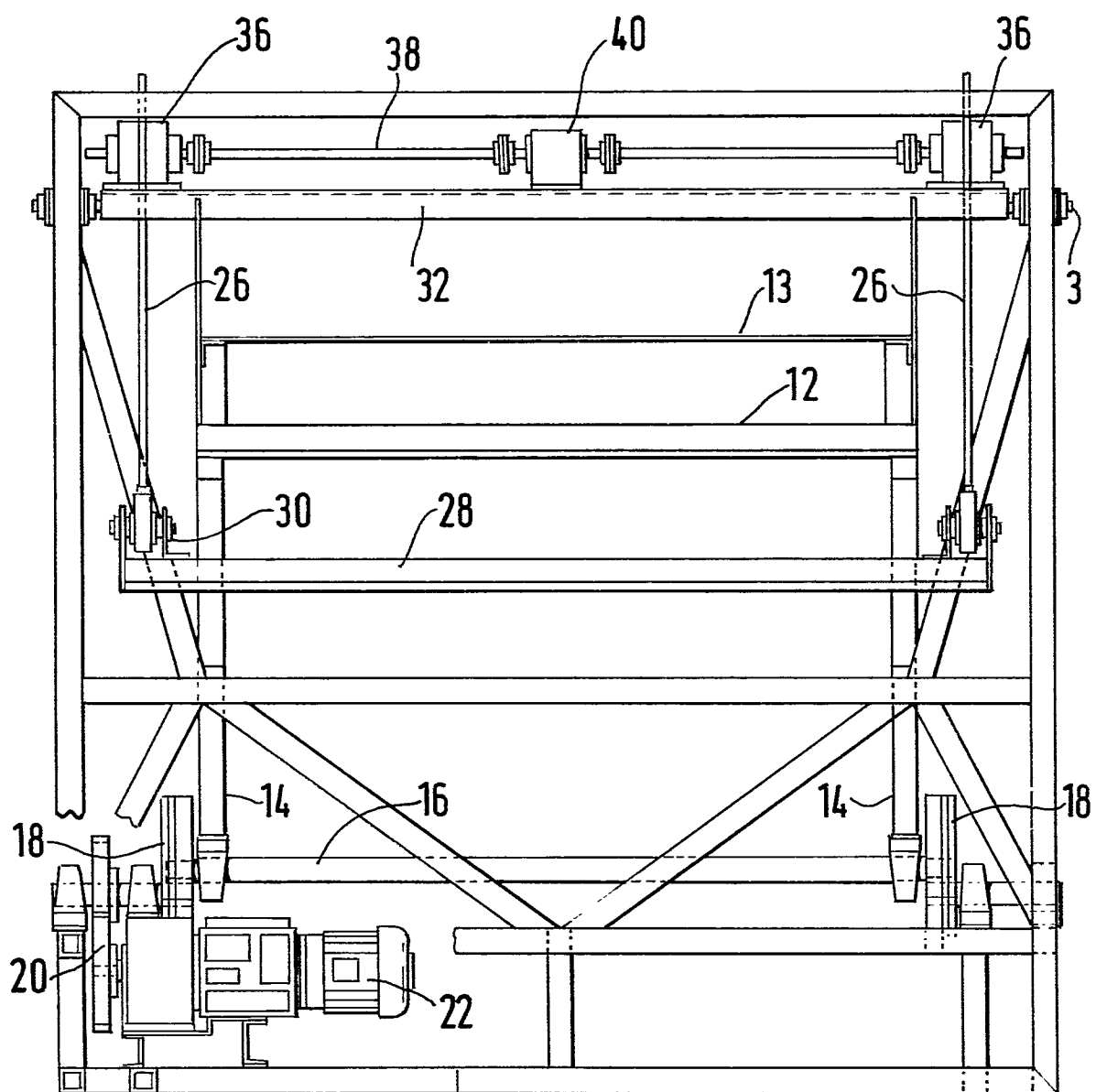


Fig. 2.