Fig. 1.

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The present invention relates to vibratory conveyors, screens or the like apparatus having a deck, trough or the like means, hereinafter referred to as a trough, which is arranged to be vibrated so as to urge material or articles thereon to move along the length of the apparatus. In the case of a vibrating screen, part of the material may fall through the trough or screen while the remainder is urged along the length of the screen. An object of the present invention is the provision of improved vibratory conveyors, screens or the like apparatus of this kind.

According to the present invention, a vibratory conveyor, screen or the like apparatus comprises a supporting framework, a trough, a first spring means of the leaf type inclined at an angle to the length of the trough and connecting the framework to the trough, a second spring means of the helical coil type having opposed coils acting generally parallel to the length of the trough, the said coils of the second spring means constraining the trough between them and being attached to the framework at opposite ends, and means arranged to vibrate the trough in a direction parallel to its length.

The means arranged to vibrate the trough in a direction parallel to its length may be an electro-magnetic vibrator. The supporting framework may be substantially heavier than the trough, and may be provided with resilient suspensions. The degree of compression of the coils of the second spring means may be adjustable. The first spring means may comprise two sets of leaf springs oppositely inclined at equal angles to the length of the trough, connection to the framework being effected through resilient means which may be locked, the arrangement being such that by locking the resilient connection of one set of leaf springs only the trough may be arranged to move in one direction, while locking the resilient connection of the other set of leaf springs only causes the direction of motion to be reversed. The resilient means employed for this purpose may comprise two or more cantilever springs, one end of each spring being attached rigidly to the framework while the other end is attached to the corresponding set of leaf springs.

A vibratory conveyor in accordance with the present invention will now be described by way of example with reference to the drawing in which Figure 1 shows a side elevational view and Figure 2 an end elevational view of a non-reversible conveyor, while Figure 3 shows diagrammatically the type of modification required to make the motion of such a conveyor reversible.

Referring now to Figures 1 and 2, a trough 1 has cross-members 2 attached to the underside of the bed of the trough and connected at their ends through leaf-springs 3 and helical coil springs 4, 5 to a supporting framework 6. The coils 4, 5 are arranged parallel to the trough 1 and are arranged to constrain this trough between them through the agency of the cross-members 2 to which they are attached on opposite sides, the further ends of these springs being held against the supporting framework 6. If desired, the tension of the springs 4, 5 may be adjusted by causing the springs to terminate upon caps 7 whose position is adjustable by means of screw threaded fittings attached to the framework 6, and in the example here described the fittings terminate in lugs spring-biased into notches in the framework. An electro-magnetic vibrator 8 is attached to one end of the framework 6 with its armature fixed centrally to one of the cross-members 2 so as to vibrate the trough 1 substantially in a direction along its length. Due to the leaf-springs 3, however, which are inclined at an angle of approximately 70° to the length of the trough with their upper ends fixed to the framework 6, while their lower ends are attached to the vibrating cross-members 2, this vibrating motion will also have a component in a direction perpendicular to the line of the trough 1. Thus, with the electro-magnetic vibrator in the position shown in Figure 1 the trough will alternately be drawn backwards and downwards and then released to allow material or articles placed on the trough to be thrown upwards and forwards along the conveyor until they pass over the overlapping lip of the trough and are discharged or fed into another conveyor. The vibratory motion is assisted by the resilient suspensions 9 for the framework 6, which may be of any known form. It is also advantageous if the framework 6 is substantially heavier than the trough 1.

A conveyor of this kind may be made reversible by the type of modification shown diagrammatically in Figure 3, to which reference is now made. Using the same reference numerals, the leaf springs 3 are now divided into two sets inclined at equal angles to the length of the trough. Both are joined at their lower ends to the same cross-member 2 which is attached to the trough, but the upper ends of the leaf springs are affixed to the free ends of two cantilever springs 10. The other ends of the cantilever springs are rigidly attached to the framework 6. Wedges 11 may be moved by an arm 12 acting through a pivoted crank 13 so as to lock one or other of the free ends of the cantilever springs 10, thus fixing one of these springs solidly with the framework 6. The set of leaf springs 3 whose upper end is fastened solidly to the framework 6 in this way will act to propel the trough in exactly the manner hereinbefore described, the remaining set of leaf springs 3 being rendered ineffective through the resilience of the corresponding cantilever spring 10. It will readily be seen that, since the inclinations of the two sets of leaf springs are opposite, the direction of motion of material or articles carried on the trough may be reversed in this way. Similar cantilever springs and adjustable locking means will be attached to all the ends of the cross-members 2 and it may be preferable to have two electro-magnetic vibrators facing in opposite directions so as to make use of both halves of the A.C. wave.

It will be understood that the reversal of direction need not be affected by the use of cantilever springs and wedges, but that any other type of flexible connections and associated quick-locking devices may be used.

I claim:

1. A support for a vibratory unit comprising a basic framework, a support member, leaf spring means, said leaf spring means being connected at one end to said framework and at the other end to said support member and being adapted in operation to flex in a direction substantially in a vertical plane and parallel to the length of said unit, and a pair of coil springs, said coil springs being disposed to operate in a direction substantially parallel to the length of said unit and to be constrained in opposite senses between said support member and said framework.

2. A support for a vibratory unit as claimed in claim 1.
and comprising adjustment means, said adjustment means being adapted to vary the constraint of said coil springs.

3. A support for a vibratory unit comprising a basic framework, a support member extending transversely of said unit, the ends of said support member being disposed one at either side of said unit, leaf spring means, said leaf spring means being connected at one end to said framework and at the other end to said support member and being adapted in operation to flex in a direction substantially in vertical plane and parallel to the length of said unit, and two pairs of coil springs associated respectively with the ends of said support member, the said coil springs of each pair being disposed to operate in a direction substantially parallel to the length of said unit and to be constrained in opposite senses between the associated end of said support member and said framework.

4. A support for a vibratory unit as claimed in claim 3 and comprising adjustment means, said adjustment means being adapted to vary the constraint of said coil springs.

5. A support for a vibratory unit comprising a basic framework, a support member, a pair of alternative resilient means, said resilient means being mounted on said framework, composite leaf spring means, said composite leaf spring means comprising a pair of alternative leaf spring members connected at one end to said support member and at the other end to a respective resilient means and each being adapted in operation to flex in a direction substantially in a vertical plane and parallel to the length of said unit, said leaf spring members being oppositely inclined at equal angles to the length of said unit, a pair of coil springs, said coil springs being disposed to operate in a direction substantially parallel to the length of said unit and to be constrained in opposite senses between said support member and said framework, and means for locking selectively one of said resilient means, said locking means in locking combination with said resilient means serving to connect alternatively the ends of said leaf spring members rigidly to said framework.

6. A support for a vibratory unit as claimed in claim 5 and comprising adjustment means, said adjustment means being adapted to vary the constraint of said coil springs.

7. A support for a vibratory unit comprising a basic framework, a support member extending transversely of said unit, the ends of said support member being disposed one at either side of said unit, alternative resilient means associated with each end of said supporting member, said resilient means being mounted on said framework, composite leaf spring means associated with each of said ends, each of said composite leaf spring means comprising a pair of alternative leaf spring members each connected at one end to one end of said support member and at the other to a respective resilient means and each being adapted in operation to flex in a direction substantially in a vertical plane and parallel to the length of said unit, said alternative leaf spring members being oppositely inclined at equal angles to the length of said unit, a pair of coil springs associated with each end of said support member, the coil springs of each pair being disposed to operate in a direction substantially parallel to the length of said unit and to be constrained in opposite senses between the associated end of said support member and said framework, and locking means associated with each end of said support member, said locking means being adapted to lock selectively one of said alternative resilient means, said locking means in locking combination with said resilient means serving to connect alternatively the ends of the respective leaf spring member rigidly to said framework.

References Cited in the file of this patent

UNITED STATES PATENTS


FOREIGN PATENTS

162,605 Australia ...................... Apr. 27, 1955