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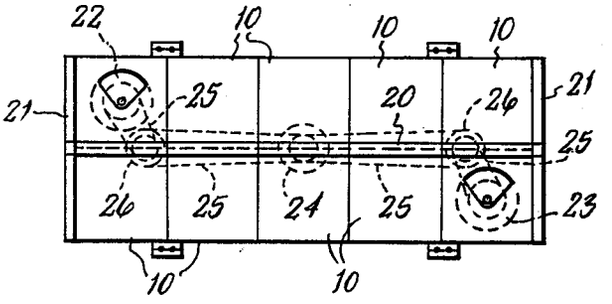
(54) A sifting machine.

(57) A sifting machine comprising a freely suspended sieve box, rectangular in plan, and comprising a plurality of sieve stacks (10) attached together side by side, and two sets of throwing weights (22, 23) disposed in two diagonally opposite corners of the sieve box such that a line between them passes through the centre of gravity thereof, the two other diagonally opposite corners being occupied by sieve stacks (10). The weights (22, 23) are driven by motor (24) and drive belts (25).



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A SIFTING MACHINE

THIS INVENTION concerns sifting machines used for sifting, cleaning or grading various comminuted or ground materials. Machines of this kind usually comprise one or more stacks of superimposed sifting elements enclosed within a casing which forms a sieve box, and the box is supported for a sifting motion in a generally horizontal plane, usually by reeds or other flexible members attached to the ceiling so that the sieve box is freely suspended therefrom.

In one kind of sifting machine generally known in the art as a free-swinging sifter, there is usually provided a motor attached to the suspended sieve box and coupled to a system of weights which are driven in rotation by the motor to set up the necessary gyratory or oscillatory motion required for sifting.

The arrangement of the free-swinging system requires that the weights providing the motion for the machine, shall be evenly distributed about the centre of gravity of the swinging mass, and so it is usual for the sieve box to be made up of a plurality of

stacks of sifting members arranged in a group with a central open area in which the weights and usually a drive motor are housed so that the weights rotate closely about the vertical centre-line, or centre of gravity, of the box. Again, with this arrangement it is usual to provide a pair of frame members one on each side of the weights and motor system to support the whole drive assembly.

The free-swinging system should enable the weight system to be adjusted easily thus to vary the motion as required. However, with the weights disposed centrally in the middle of the sieve box, this adjustment usually requires that a major part of the sieve box be stripped down to gain access to the central region thereof. One system which overcomes this problem has two sets of rotating weights mounted on axes which are outside the bounds of the sieve box, i.e. an outboard system of weights, but this arrangement presents a further disadvantage by virtue of the increased floor area occupied by the machine as a whole, and particularly since the rotating weight systems mounted outside the sieve box, must be housed within a casing or framework for safety in operation.

An object of the present invention is to provide a sifting machine wherein access to the weight system for ready adjustment thereof, is ensured, whilst the overall area occupied by the machine is minimised without a reduction of the sieving area.

According to the present invention there is provided a sifting machine comprising a freely suspended sieve box, rectilinear in plan, and comprising a plurality of sieve stacks attached together side by side, and two sets of throwing weights mounted for rotation on a pair of axes such that in plan a straight line between said axes passes through the centre of gravity of the sieve box, characterised in that the orbits of said throwing weight sets are disposed adjacent but substantially within the periphery of said rectilinear plan, whereby to maximise the area occupied by the sieve stacks whilst minimising the overall plan area of the sieve box.

An embodiment of the invention will now be described, by way of example only, with reference to the accompanying schematic drawings in which:-

Fig. 1 is a plan view of a conventional free-swinging sieve box having the throwing weight system located centrally;

Fig. 2 is a similar view of a known modified arrangement in which two sets of throwing weights are mounted outside of the sieve box;

and Fig. 3 illustrates an arrangement in accordance with the present invention.

All of the arrangements to be described are illustrated as having approximately the same sieving area and the same overall mass of throwing weights to provide the necessary sieving motion.

Referring now to the drawings, Fig. 1 illustrates a conventional arrangement of eight sieve stacks 10 arranged in two parallel rows of four, supported and held in spaced relationship by frame members 11 and 12. Further frame members 13 support a motor and throwing weight system illustrated schematically and generally by the reference numeral 14.

The whole arrangement is suspended for free swinging movement on four pairs of suspension canes 15 in the conventional manner. Thus, the rotating weights at 14 impart to the whole assembly a gyratory motion about the axis of rotation of the weights.

It will be seen that in order to gain access to the weight system for maintenance or adjustment it is necessary for a substantial part of the assembly to be stripped down thus placing the sifting machine out of action for a considerable period.

The sieve box arrangement illustrated in Fig. 2, overcomes the problem of access to the throwing weight system by placing it outside of the bounds of the sieve stacks so that the two rows thereof can be combined and supported by a less substantial framework, for example as illustrated at 16. In this arrangement, which also is known, the weight system is divided into two halves mounted respectively at the two ends of the sieve box as illustrated at 17 and 18. A single motor (not shown) is mounted centrally beneath the sieve box, and a pair of toothed belts (not shown) transmit the drive outwardly to the axis of rotation of the weights 17 and 18. By rotation of the two sets of weights 17 and 18 at the same speed and in the same direction, and by ensuring that they are constrained to rotate in phase, the gyratory motion provided by the drive system according to Fig. 1, can again be achieved. Alternatively, in this known system the weights can be allowed to rotate out of

phase so that a linear oscillatory motion is achieved.

Whilst this arrangement provides ready access to the weight and drive systems for adjustment thereof or for repair, it does however occupy a considerable amount of floor area without additional sieving area, which in practical terms is illustrated by the dotted lines 19. Since space is an important aspect when designing this kind of equipment, it was necessary to design an arrangement wherein ready access to the weight systems is maintained whilst the overall area occupied by the machine is minimised without loss of sieving capacity. To this end, the arrangement illustrated in Fig. 3 has been devised and is one embodiment of the invention as defined.

Reduction in floor area, combined with ready access to the weight systems is achieved by offsetting the two sets of weights as illustrated at 22 and 23 one to each side of a central frame member 20. Thus, in plan, the machine is of rectilinear form and a straight line drawn between the axes of rotation of the two sets of weights, would pass through the centre of gravity of the sieve box. The weights are thus disposed at diagonally opposite corners, but their orbits are within the periphery of

the rectilinear plan of the sieve box and are thus accessible with minimal dismantling. As can be seen by comparing Figs. 2 and 3, the latter arrangement occupies less floor area, and the weights and drive systems are enclosed for safety. Again, in this embodiment a single centrally disposed motor 24 (not shown) may be mounted above or below the sieve box with appropriate toothed drive belts 25 and pulleys 26 connecting it for rotation to the two sets of weights 22 and 23.

As described in relation to Fig. 2, the drive system may be arranged to impart to the sieve box, a gyratory or oscillatory motion as required.

It is not essential that the sets of weights 22 and 23 be disposed at opposite corners of the sieve box. Alternatively they may be disposed in any symmetrical positions about the centre of gravity of the box, the remainder of the plan area of the box being occupied by complete sieve stacks.

It is not intended to limit the invention to the above example only, many variations, such as might readily occur to one skilled in the art, being possible without departing from the scope of the invention as defined in and by the appended claims.

For example, whilst the sieve box has been illustrated as comprising eight separate sieve stacks, the invention can be applied to any number of stacks, where the stacks, preferably though not exclusively, are arranged in two or more rows.

CLAIMS

1. A sifting machine comprising a freely suspended sieve box, rectilinear in plan, and comprising a plurality of sieve stacks attached together side by side, and two sets of throwing weights mounted for rotation on a pair of axes such that in plan a straight line between said axes passes through the centre of gravity of the sieve box, characterised in that the orbits of said throwing weight sets are disposed adjacent but substantially within the periphery of said rectilinear plan, whereby to maximise the area occupied by the sieve stacks whilst minimising the overall plan area of the sieve box.

2. A sifting machine according to Claim 1, wherein said sieve stacks are arranged in a plurality of parallel rows attached together side by side.

3. A sifting machine according to Claim 1, wherein the orbits of said throwing weights sets are disposed wholly within the periphery of the rectilinear plan of said sieve box.

4. A sifting machine according to Claim 1, wherein said sieve stacks are arranged in two parallel rows, said sets of throwing weights being mounted respectively on opposite sides of a centre line between the two rows of sieve stacks.

5. A sifting machine, according to Claim 1, wherein said sieve stacks are arranged in two parallel rows each having four stacks, the rows being mounted on opposite sides respectively of a central frame member.

6. A sifting machine according to Claim 1, wherein a drive system for said throwing weights is adapted to impart to the sieve box, selectively, a gyratory or oscillatory motion, as required.

7. A sifting machine according to Claim 1, wherein at least one drive motor is mounted on the sieve box, with positive drive means connecting it to said throwing weight sets.

8. A sifting machine according to Claim 1, wherein the sieve box is rectangular in plan, the two sets of throwing weights being disposed at two diagonally opposite corners of its rectangular form but within the periphery thereof, the two corresponding opposite diagonal corners being

occupied by sieve stacks.

9. A sifting machine substantially as hereinbefore described, with reference to and as illustrated in the accompanying drawings.

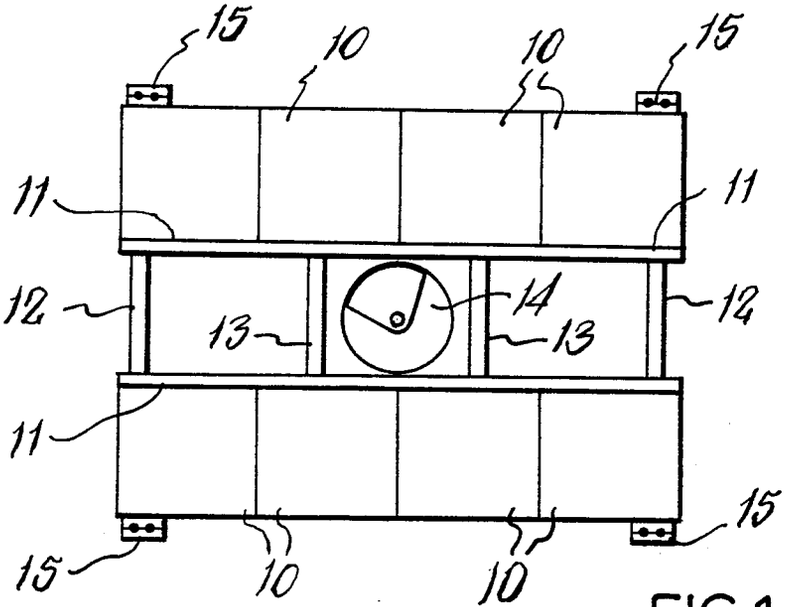

FIG.1

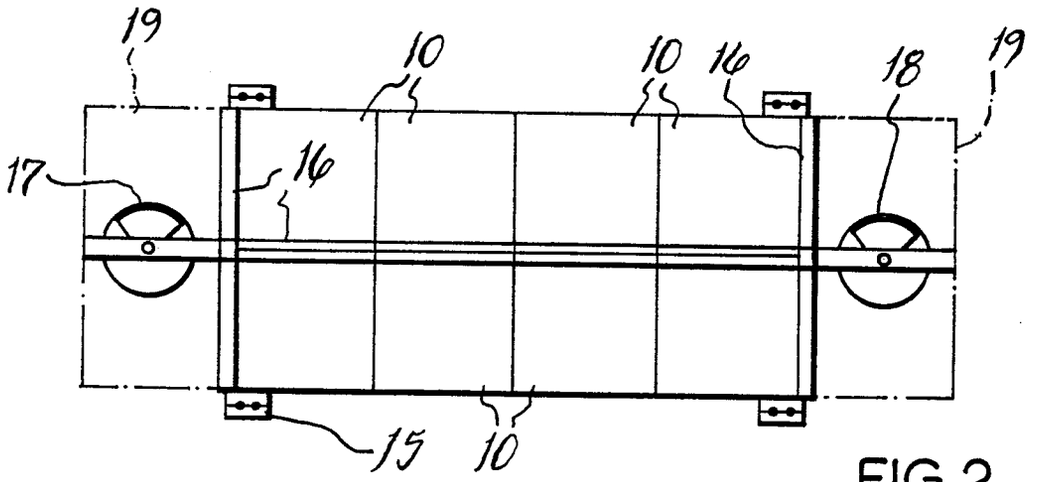

FIG.2

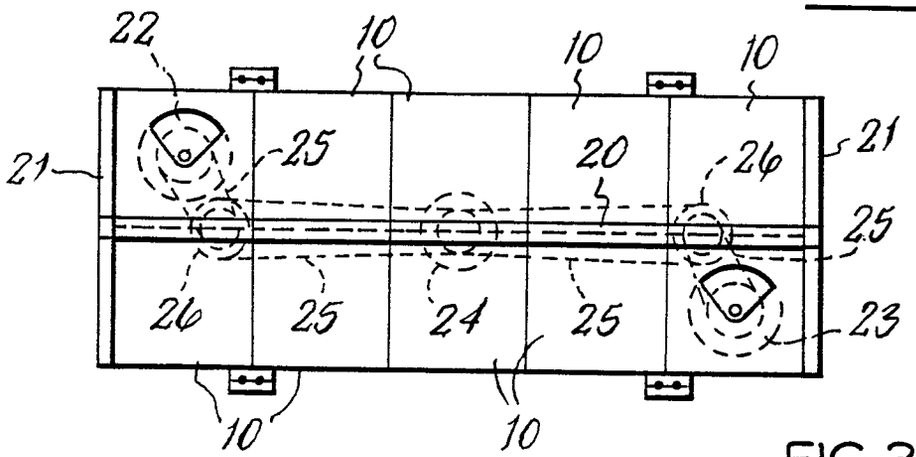

FIG.3