Jan. 3, 1928.

1,654,815

P. JUBIEN ET AL

AGITATOR

Filed Oct. 3, 1924

3 Sheets-Sheet 1

Fig. 1.

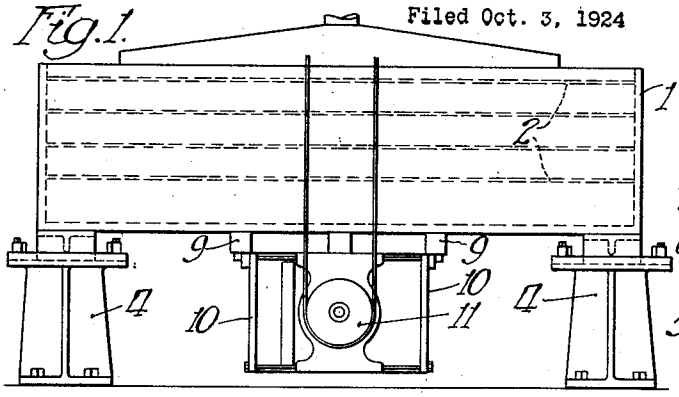
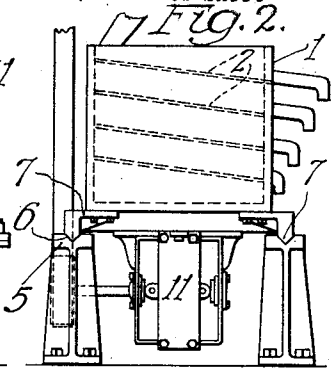


Fig. 2.



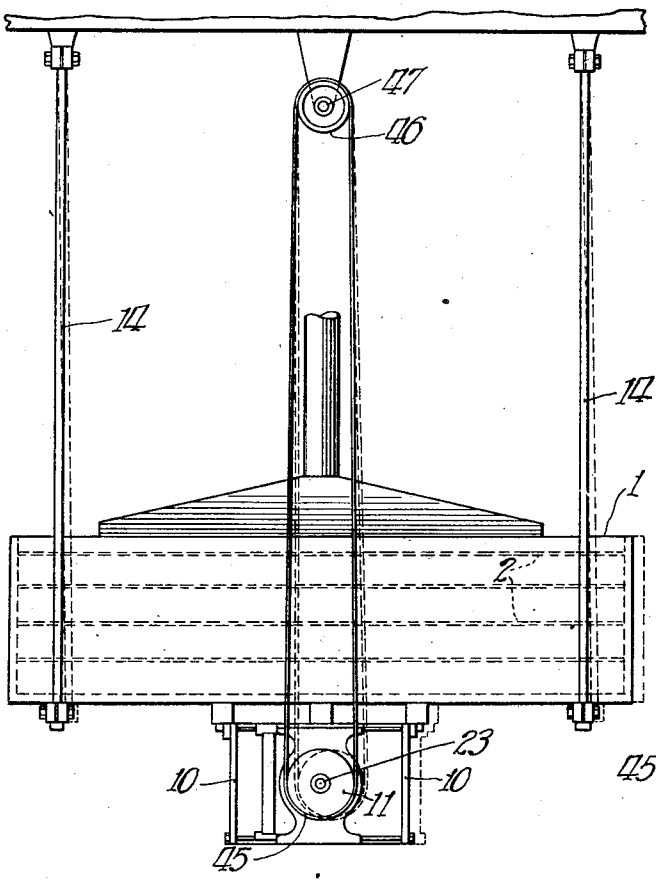


Fig. 3

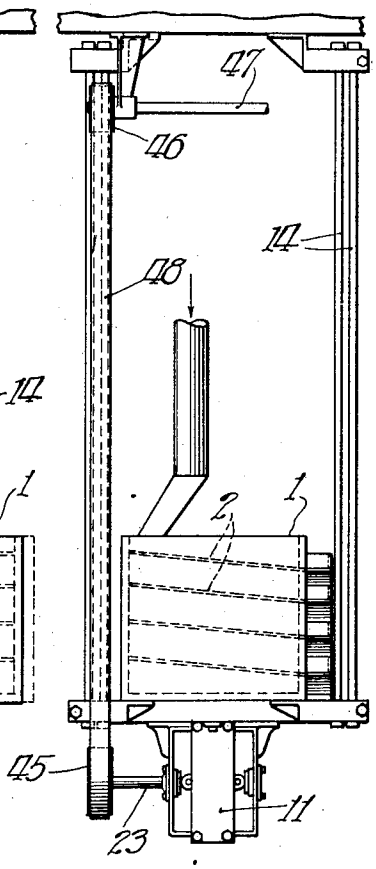


Fig. 4.

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Fig. 6

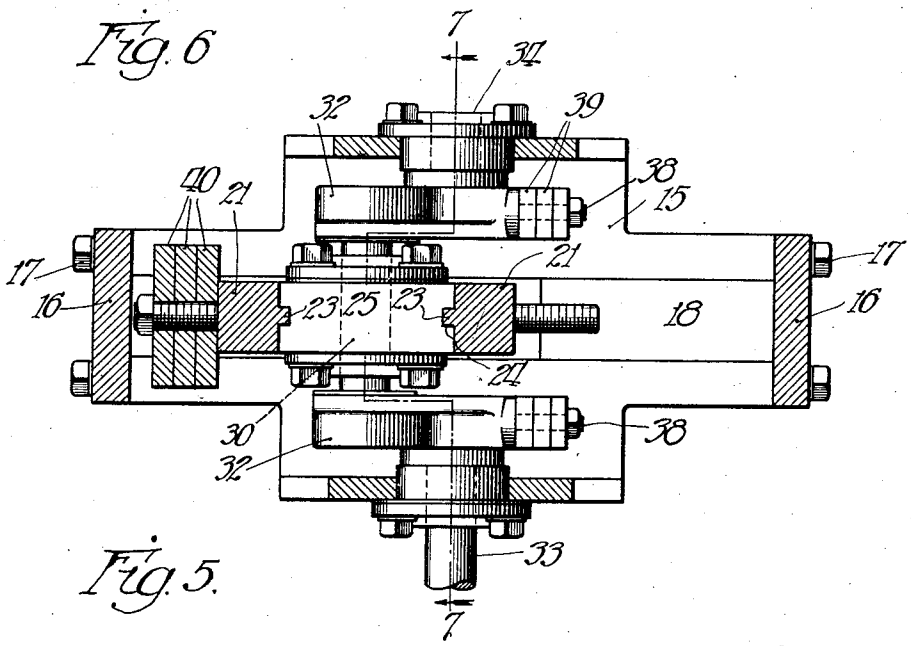
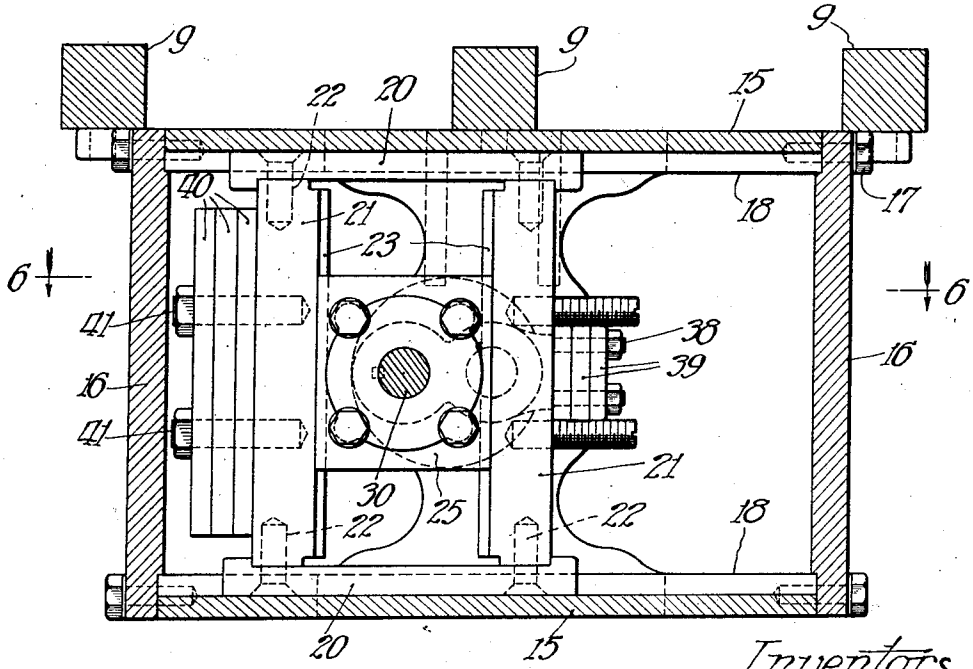


Fig. 5.



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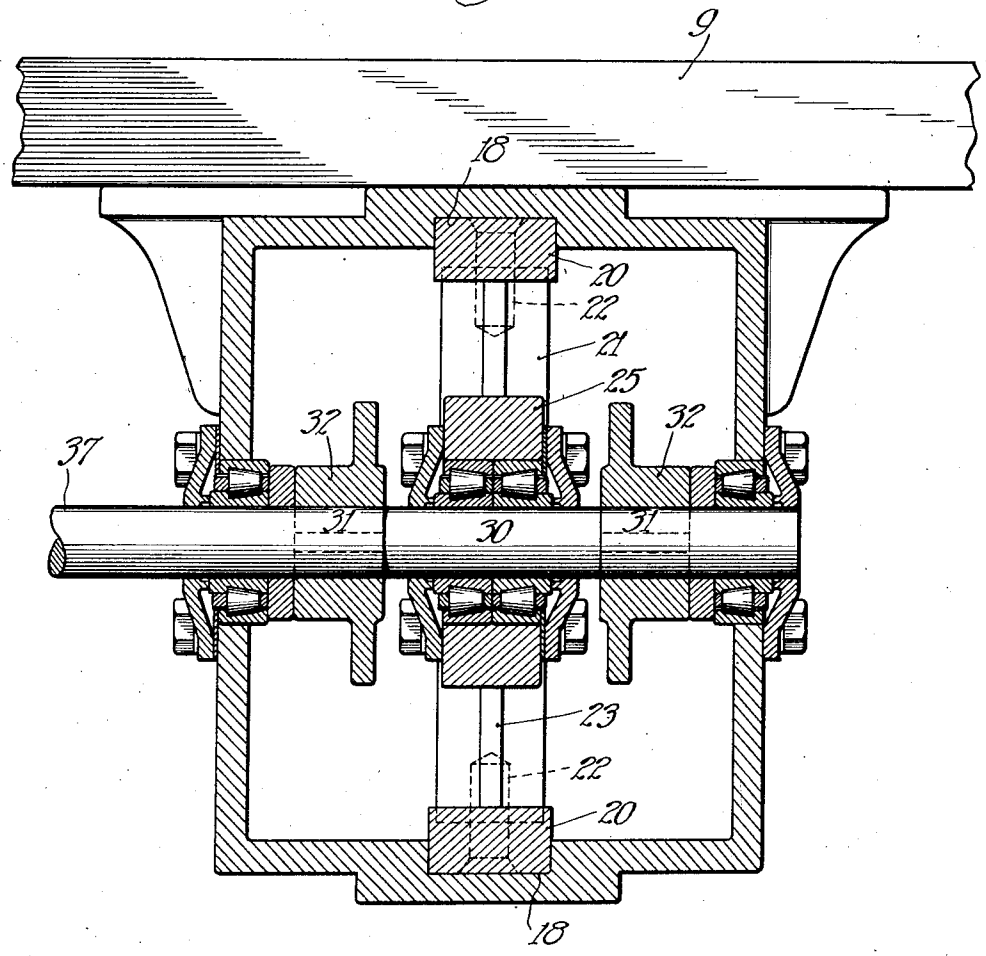
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AGITATOR

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Fig. 7.



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UNITED STATES PATENT OFFICE.

PAUL JUBIEN AND PAUL NAEHER, OF CHICAGO, ILLINOIS; SAID JUBIEN ASSIGNOR TO SAID NAEHER.

AGITATOR.

Application filed October 3, 1924. Serial No. 741,388.

Our invention relates to machinery by which various materials are agitated and treated by sieves or screens to effect separation, mixing or grading of the constituent elements. The class of operations in question is very diverse in character and applies to the milling of grains and blending of flours, the grinding and mixing of feed stuffs and grading and blending of grain as to size, and the removal of weed seeds, chaff and other extraneous matters. Chemical and fertilizer plants, grain elevators, cement works and many others offer increasing fields for the use of screens and sieves. With this increasing use in these many fields has come a demand for machines of greater size and capable of heavier duty. Where reciprocating devices, in which stationary abutments take the power thrusts by which screens are moved, and where the agitation of material and screens is effected as a result thereof, the operations are not fully efficient in effect and are more or less self destructive to the mechanism, and this is particularly true when applied to the heavy duty and service now demanded.

We have discovered that screen capacity ordinarily can be greatly increased by amplification of screen movement and that the output and character of the separation can be improved thereby, and by relatively smooth screen action. It is a principal object of our invention to cause controlled screen movements and to create smoother screen action by power applied relatively to movable abutments so as to take advantage of inertia both moving and stationary in so doing.

It is a further object thereof to reduce the power required, to ease the shocks of reciprocating machinery, to reduce the noise and disagreeable features of vibration, to greatly increase the capacity of the screens used, and greatly prolong the life of the apparatus.

Further objects are the development of compact and convenient means for constructing, connecting and assembling mechanical elements to carry out the principles of our invention, and which are shown in the drawings and pointed out in the claims.

The principles of our invention are illustrated in the drawings in which Figs. 1 and 2 represent side and end elevations of our device in which the screening mechanism is adapted to reciprocate on stationary supports or pedestals; Figs. 3 and 4 represent similar views as above stated, but in which the apparatus is suspended from a plane above the screening apparatus itself; Fig. 5 shows a side elevation of the shaking mechanism; Fig. 6 is a section on line 6—6 of Fig. 5; Fig. 7 is a detail taken on dotted line 7—7 of Fig. 6.

Further describing our invention with reference to the drawings in which like characters of reference denote like parts throughout: Numeral 1 represents a shaker box in which are mounted a number of screens 2. Numeral 4 designates a number of pedestals adapted to support the shaker box and provided with heads 5 having longitudinal grooves 6 within which are received correspondingly formed downwardly projecting members 7 which are formed on brackets 8 and attached to the shaker frame.

Substantial timbers 9 are attached to the bottom of the shaker frame between the ends thereof and form a substantial foundation from which depends a casing 10 which carries the crank mechanism 11 by which reciprocating impulses are imparted to the shaker frame.

The shaker frames 1 with screens 2 therein are also shown in Figs. 2 and 3 which are supported by wooden rods 14 or other substantially non-crystallizable material, and by which the same is suspended from the ceiling, wall or upper portion of the machine construction. To the under portion of the shaker frame an apparatus for giving reciprocating movement, substantially the same as shown in Fig. 1, is attached.

The details of a preferred form of such apparatus, as indicated in Figs. 1 and 3, is shown in Fig. 6, in which a box or casing is provided which may consist of horizontal sections 15 of metal forming respectively the top and bottom of the casing, and vertical members 16, forming ends thereof; the same being secured together by tap-bolts 17. The said top and bottom pieces have grooves or recesses 18 on their inner faces to slidably receive a rectangular frame-work consisting of the upper and lower members 20 and the relatively vertical members 21 which are framed together and secured by tap-bolts 22. Said members 21 have projecting strips 23 forming guides which are received within corresponding guide-ways 24 of sliding block 25. A wrist pin 30 passes through the said

sliding block 25, and the ends thereof 31 are received in the ends of cranks 32 which, with the shaft sections 33 and 34 form the crank shaft by which the sliding block 25 is moved up and down on the guides 23 while, at the same time, the guides are moved in a relatively horizontal direction. To balance the weight of the wrist pin and the immediately attached portions of the crank, bolts 38 are attached thereto by means of which counter-weights 39 are secured in place, as shown. On the other hand, for the purpose of increasing the horizontal impulses of the crank shaft and its connections with the shaker frame, weights 40 are secured to the members 21 by means of tap-bolts 41. And these may be increased or decreased as desired to vary the amplitude and character of the screen movement. On the extended side of the said crank shaft, as shown in Figs. 2 and 4, is a pulley 45 which is driven from pulley 46 on a power or line shaft 47, by means of a belt 48.

The structure shown in Figs. 5, 6 and 7, when attached as shown to the suspended shaker frames, have movement resulting from the reciprocating action of the sliding block and its connections, in the casing, thus forming a reciprocating engine by which backward and forward impulses are given to the shaker frame. The latter is thus caused to move backwardly and forwardly upon the slings or rods, as shown in Figs. 2 and 3 or upon the slides moving on the pedestal heads 5, as shown in Figs. 1 and 2. It will be seen that the reciprocating impulses are directly transferred to the shaker frame without re-actionary impulses being communicated to the frame-work or support of the sifting machine as a whole or the building in which it is placed.

We claim:

1. In an agitator; a shaker box adapted to reciprocating movement, means to hold the movement of the shaker box to a pre-determined path, a free-moving reciprocating weighted head connected with and adapted to move in a path substantially parallel to the path of movement of the shaker box, a shaft rigidly journaled to the shaker box for giving reciprocating action to said head, and means independent of the shaker box for rotating said shaft.

2. In an agitator; the combination with a shaker box adapted freely to reciprocate in established paths of movement and a machine supporting casing rigidly attached thereto and supported thereby, of a free-moving reciprocating device mounted in said casing, and a rotating driving element journaled in said machine supporting casing and operatively connected with said reciprocating device.

3. In an agitator; the combination of a shaker box free to reciprocate in established paths of movement, a casing attached to and moving with said shaker box, a substantially vertical frame-work slidable in said casing in a moving path thereof, a block vertically slidable in said frame-work, and a crank shaft journaled in rigid relation to the casing and having its wrist pin journaled in said slidable block.

4. In an agitator; the combination of a shaker box free to reciprocate in an established path of movement, a casing attached to said shaker box, a frame-work horizontally slidable in said casing, a block vertically slidable in said frame-work, a crank shaft journaled in rigid relation to the casing and having its wrist pin journaled in said slidable block, and means non-rigidly related to said mechanism for rotating said crank shaft.

5. In an agitator; the combination of a shaker box free to reciprocate in an established path of movement, a casing attached to said shaker box, frame-work horizontally slidable in said casing, means for adjustably weighting said frame-work, a block vertically slidable in said frame-work, a crank shaft journaled in rigid relation to the casing and having its wrist pin journaled in said slidable block, and means non-rigidly related to said mechanism for rotating said crank shaft.

6. In an agitator; a shaker box having guiding and attaching means, a supporting base therefor provided with ways to receive said guiding and attaching means, a free-moving reciprocating head mounted on the shaker box, and a crank shaft rigidly journaled to the shaker box to actuate said head.

7. In an agitator; the combination with a freely movable shaker box of guide-ways attached thereto, a head movable in the guide-ways, means rotatable relatively to the guide-ways for giving reciprocating movement to said head, and flexible means for communicating power to said head.

In witness whereof, we have hereunto set our hands, at Chicago, Illinois, this 24th day of September, 1924.

PAUL JUBIEN.
PAUL NAEHER.