

Oct. 29, 1929.

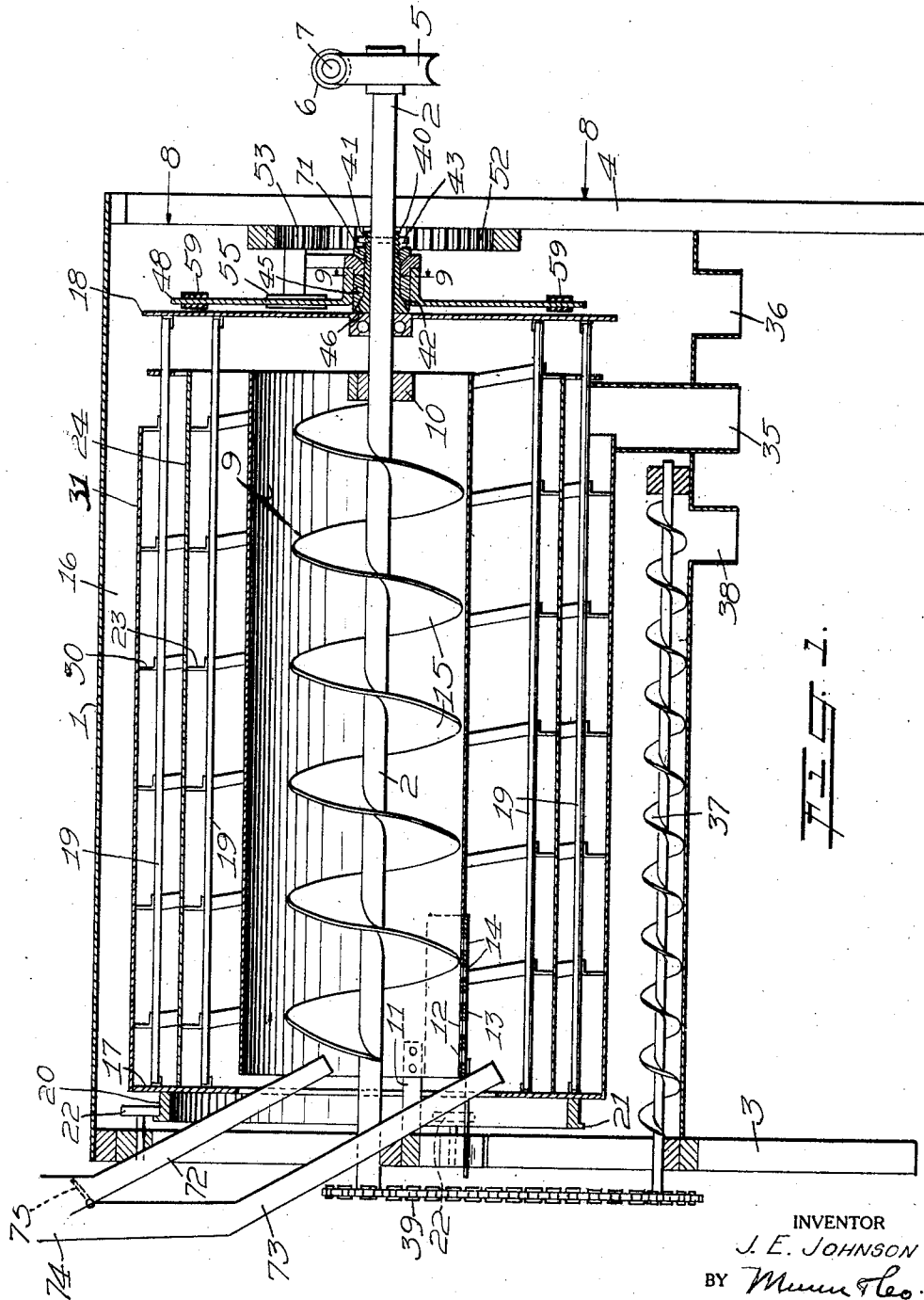
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1,733,604

GRAIN CLEANER

Filed March 28, 1927

3 Sheets-Sheet 1



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GRAIN CLEANER

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3 Sheets-Sheet 2

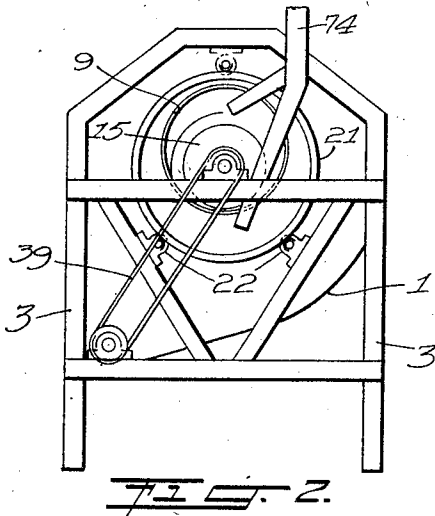
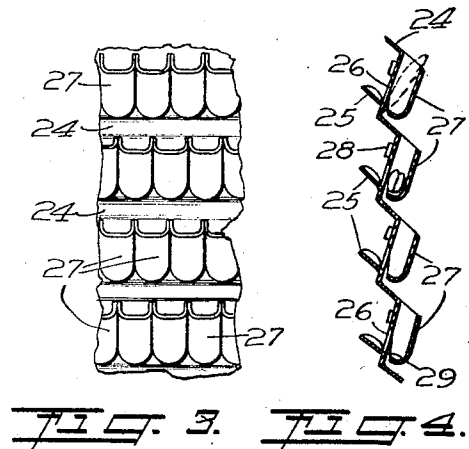


FIG. 3.

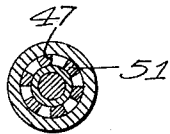
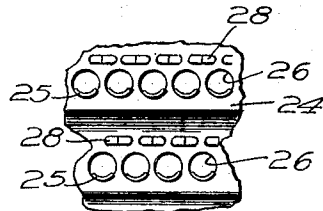


FIG. 5.

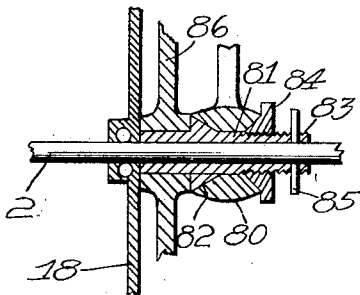


FIG. 6.

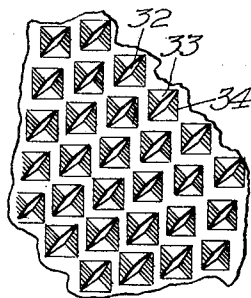


FIG. 7.

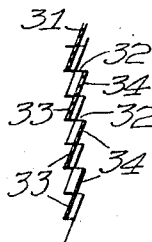


FIG. 8.

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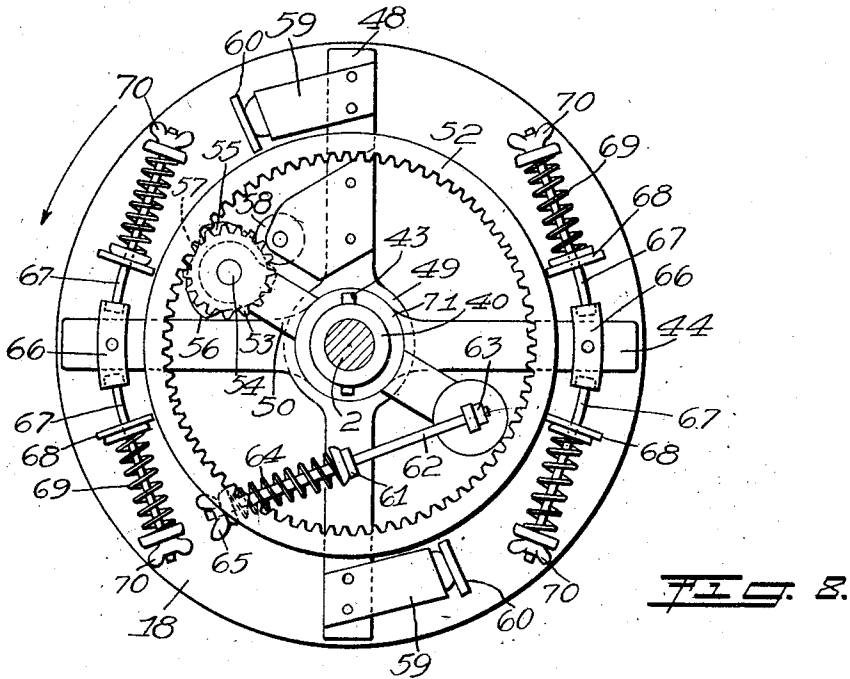
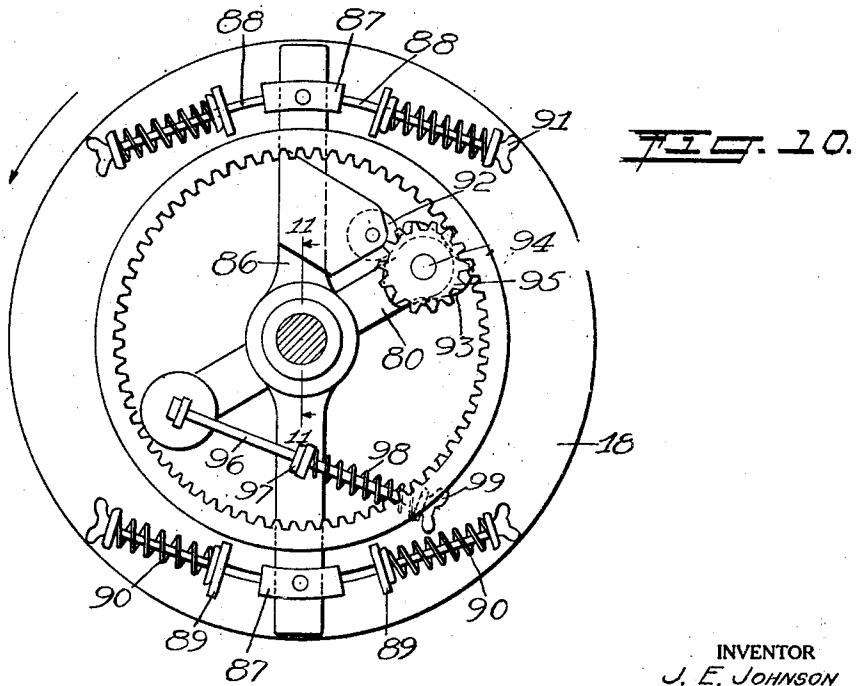
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GRAIN CLEANER

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3 Sheets-Sheet 3



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GRAIN CLEANER

Application filed March 28, 1927. Serial No. 179,039.

My invention relates to improvements in grain cleaners, and it consists in the combinations, constructions, and arrangements herein described and claimed.

5 An object of my invention is to provide a grain cleaner which separates from wheat all other grains and foreign substance. If wheat has a mixture of two to five per cent other grain, it is not considered as pure wheat and is sold at a lower price. If there is a mixture of more than five per cent other grain in the wheat, the wheat is sold for screenings at a low price.

15 A further object of my invention is to provide a device of the type described which may be used separately or in connection with a thrashing machine.

20 A further object of my invention is to provide a device of the type described which separates larger and relatively long grains, such as oats and barley, from the wheat and disposes them in a separate compartment.

25 A further object of my invention is to provide a device of the type described which will separate smaller grains and dust from the wheat and dispose them in another compartment.

30 A further object of my invention is to provide a device of the type described which separates the grains at a rapid rate of speed, thus making it possible for the device to be used with a thrashing machine.

35 Other objects and advantages will appear in the following specification, and the novel features of the invention will be particularly pointed out in the appended claims.

My invention is illustrated in the accompanying drawings, forming part of this application, in which

40 Figure 1 is a longitudinal sectional view of my device,

Figure 2 is an end elevation of my device,

Figure 3 is a fragmentary plan view of one of the screens,

45 Figure 4 is a section substantially along the line 4—4 of Figure 3,

Figure 5 is a fragmentary portion of that shown in Figure 3,

50 Figure 6 is a fragmentary plan view of the other screen,

Figure 7 is a section along the line 7—7 of Figure 6,

Figure 8 is a section along the line 8—8 of Figure 1,

Figure 9 is a section along the line 9—9 of Figure 1,

Figure 10 is a modified form of the cylinder oscillating means, and

Figure 11 is a section along the line 11—11 of Figure 10.

60 In carrying out my invention, I provide a casing 1 having a longitudinally extending shaft 2 rotatably mounted in the end walls 3 and 4 thereof. A worm gear 5 is rigidly mounted upon one end of the shaft 2 and is in mesh with a worm 6. The worm 6 is rigidly mounted upon a shaft 7 which is operatively connected to a power means, not shown.

65 A cylinder 9 has a bearing support 10 at one end thereof for receiving the shaft 2. The opposite end of the cylinder 9 is rigidly secured to the end wall 3 by strips 11. Relatively small openings 12 are provided in the cylinder 9 and are adapted to be closed by a shutter 13. The shutter 13 is provided with a plurality of relatively small openings 14 which are adapted to be moved into alignment with the openings 12. The shaft 2 is provided with a spiral 15, the lower portion of which is disposed adjacent the lower portion of the cylinder 9.

75 A revolving unit 16 is disposed concentric with the shaft 2 and the cylinder 9. The unit 16 is composed of end plates or discs 17 and 18 which are connected to each other by angle irons 19. An annular ring or track 20 is rigidly mounted upon the disc 17 and provided with an outwardly extending flange 21. A plurality of spaced-apart supporting rollers 22 is rotatably carried by the end wall 3. The supporting rollers 22 are disposed in engagement with the ring or track 20 for supporting the unit 16.

80 An inner spiral 23 is disposed concentric with the cylinder 9 and rigidly mounted upon the inner row of angle irons 19. An inner screen 24 is disposed concentric with the spiral 23 and rigidly mounted thereupon. The screen 24 is constructed as shown in Figures 3, 4 and 5. The screen proper is irregu-

lar in cross sectional contour, see Figure 4, and is provided with punched-out arcuate-shaped integral lips 25. The lips 25 when they are punched out of the screen 24 form a circular adjacent opening 26. A pocket 27 is provided for each of the openings 26 and is rigidly secured to the screen 24 by integral lugs 28. The lugs 28 extend through openings in the screen 24 and are crimped in place. The pockets 27 have tapered surfaces 29 which taper outwardly from the openings 26 for a purpose hereinafter described.

A spiral 30 is rigidly mounted upon the outer row of angle irons 19. An outer screen 31 is disposed concentric with the spiral 30 and is rigidly secured thereto. The screen 31 is provided with a plurality of staggered openings 32. The openings 32, see Figures 6 and 7, are formed by first cutting the screen the length of the opening, and then by forcing the metal upon one side of the cut inwardly, as indicated at 33, and on the other side of the cut outwardly, as indicated at 34. In Figure 7, it will be observed that the outwardly extending portion 34 of one of the openings 32 is in alignment with the inwardly extending portion 33 of the adjacent opening 32. The screen 31 stops short of the end of the inner screen 24 and is provided with a wheat outlet 35. The inner screen 24 stops short of the disc 18. An outlet opening 36 is provided for the casing 1 for a purpose hereinafter described.

A relatively small spiral 37 is rotatably disposed adjacent the lower portion of the casing 1. An opening 38 is provided in the casing 1 adjacent one end of the spiral 37. The opposite end of the spiral 37 is operatively connected to the spiral 15 by means of a chain 39.

A sleeve 40 having a threaded end 41 is disposed concentric with the shaft 2 and provided with a tapering portion 42. The sleeve 40 is secured to the shaft 2 by a removable pin 43. An outer set of agitator arms 44 is provided with a hub 45 having a tapered surface 46 which is adapted to engage with the tapered surface 42 of the sleeve 40. The hub 45 is disposed concentric with the sleeve 40 and is provided with a plurality of grooves 47. An inner set of agitator arms 48 is provided with a hub portion 49. The hub portion 49 is disposed concentric with the hub 45 and is held in place by a cam lever 50. The cam lever 50 is rotatably mounted upon the sleeve 40 and is provided with tongue portions 51 which are receivable in the grooves 47 of the hub 45.

A ring gear 52 is rigidly mounted upon the end wall 4 concentric with the shaft 2. A pinion 53 is rigidly mounted upon a shaft 54 at one end of the cam lever 50. The shaft 54 is rotatably carried by the cam lever 50 and is provided with a cam 55. The cam 55 is provided with a plurality of enlarged por-

tions 56 adjacent to which are disposed immediately reduced portions 57. A cam roller 58 is rotatably carried by one of the outer agitator arms 44 and is disposed in engagement with the cam 55. The agitator arms 44 are provided at their outer ends with knockers or hammers 59. Flanges 60 are integral with the disc 18 and extend outwardly in engagement with the hammers 59. A lug 61 is integral with one of the arms 44 and is provided with an opening for receiving a retaining rod 62. One end of the retaining rod 62 is pivotally connected at 63 to the free end of the cam lever 50. A tension spring 64 is disposed concentric with the other end of the rod 62 and is held in place by a wing nut 65. The tension of the spring 64 may be varied by movement of the wing nut 65 upon the retaining rod 62.

The agitator arms 48 are provided with collars 66 to which are secured adjusting rods 67. The adjusting rods 67 extend through flanges 68 which are integral with the disc 18. Compression springs 69 are disposed concentric with the adjusting rods 67 and are held in place by wing nuts 70. The tension of the springs 69 may be varied by the movement of the wing nuts 70 upon the adjusting rods 67. The agitator arms 44 and 48 and the cam lever 50 are held in place by a tapered nut 71. Grain pipes 72 and 73 extend from a main pipe 74. The pipe 73 extends into the cylinder 9 and the pipe 74 extends into the revolving unit 16. A shutter 75 is provided for the pipes.

From the foregoing description of the various parts of the device, the operation thereof may be readily understood. When the shaft 7 is operatively connected to a power means, not shown, the shaft 2 will be rotated in a clockwise direction, looking at the feeding end of the device. As the shaft 2 is rotated, the unit 16 is rotated about the cylinder 9.

Let us assume that the shutter 75 is disposed in the position shown in Figure 1, and that grain is being passed through the main pipe 74 and the grain pipe 73. This grain passes into the revolving unit 16 upon the screen 24. The rotation of the unit 16 by the aid of the spiral 23 tends to move the grain to the rear of the revolving unit.

During the rotation of the revolving unit 16, the pinion 53 which is in mesh with the ring gear 52 is rotated, thus rotating the cam 55. During the rotation of the cam 55, the agitator arms 44 are moved with a violent irregular action, due to the contact of the cam roller 58 with the cam 55. This movement is created by the cam roller 58 riding upon the enlarged portions 56 and then being received in the reduced portions 57. As the cam roller 58 rides upon the enlarged portions 56, the speed of the rotation of the unit

16 is decreased, and as the cam roller 58 passes over the enlarged portion 56 into the reduced portion 57, the revolving unit 16 increases its speed of rotation. This causes the vibratory as well as a rotative movement of the unit 16.

During this movement of the unit 16, the wheat grains will be received in the pockets 27 and as the wheat is relatively round, it will pass through the openings 26 over the lips 25 and upon the outer screen 31. The slots or openings 32 in the outer screen 31 are relatively flat and will not permit the wheat grains to pass therethrough. Therefore, the wheat grains are carried by the spiral 30 to the end of the outer screen 31 where they pass from the rotating unit 16 into and through the outlet pipe 35.

It is obvious that smaller grains, such as mustard seed and other particles, such as dust, may pass through the openings 26 and upon the outer screen 31. However, the openings 32 are of sufficient size to allow the smaller grains and dust to pass therethrough into the bottom of the casing 1. These smaller grains, together with the dust, are moved into alignment with the outlet opening 38 by the spiral 37. Relatively long grains, such as oats and barley may be received in the pockets 27, but due to their length are prevented from passing through the openings 26. An illustration of this is given in dotted lines in Figure 4. The tapered portions 29 of the pockets 27 provide a trap for receiving the pointed ends of the oat or barley grains as they pass into the pockets 27, thus holding these grains until the revolving unit has been moved to a point sufficient to allow these grains to drop out of the pockets. As the unit 16 rotates, the oat and barley grains are moved by the spiral 23 to the extremity of the unit where the grains pass through the outlet opening 36.

Let us assume that the device is used in connection with a thrashing machine and that the owner of the grain does not wish to have the grain cleaned. The shutter 75 is moved into engagement with the grain pipe 73, thus permitting the grain to pass from the main pipe 74 through the pipe 72. By moving the nut 71 into engagement with the pin 43, the spiral 15 upon the shaft 2 may rotate within the cylinder 9 without rotating the unit 16. In this manner, the grain passing through the grain pipe 72 and into the cylinder 9 will be carried through the cylinder and deposited within the casing 1 where it will pass therefrom through the outlet 36.

In Figures 10 and 11, I have shown a simplified form of agitating means. This means consists of a cam lever 80 which is mounted upon a sleeve 81. The sleeve 81 is provided with a tapered surface 82 and a threaded portion 83 for receiving a tapered nut 84.

The cam lever 80 is rigidly held in engagement with the sleeve 81 by the nut 84. The sleeve 81 is secured to the shaft 2 by a removable pin 85. A set of agitator arms 86 is rigidly held between the cam lever 80 and the disc 18. Collars 87 are carried by the outer ends of the agitator arms 86 and are provided with retaining rods 88. The retaining rods 88 extend through flanges 89 which are integral with the disc 18. Compression springs 90 are disposed concentric with the rods 88 and are held in engagement with the flanges 89 by wing nuts 91. The tension of the springs 90 may be varied by moving the wing nuts 91 upon the rods 88. A cam roller 92 is carried by one of the agitator arms 86 and is disposed in engagement with a cam 93. The cam 93 is identical in construction to the cam 55 shown in Figure 8. The cam 93 is rigidly mounted upon a shaft 94 which is rotatably carried by one end of the cam lever 80. A pinion 95 is rigidly mounted upon the shaft 94 and is in mesh with the ring gear 52. The free end of the cam lever 80 is provided with a retaining rod 96 which extends through a lug 97 which is integral with one of the agitator arms 86. A spring 98 is disposed concentric with the retaining rod 96 and is held in engagement with the lug 97 by a wing nut 99.

I claim:

1. A device of the type described, comprising a casing, a shaft rotatably disposed in said casing, a revolving unit disposed in said casing, means for yieldingly securing said revolving unit to said shaft, and means operated by rotation of said shaft to impart an oscillatory movement to said unit relative to said shaft.

2. A device of the type described comprising a casing, a shaft rotatably disposed in said casing, a revolving unit disposed in said casing, resilient means supporting said revolving unit upon said shaft, means for rotating said revolving unit, and means on said shaft for alternately increasing and decreasing the speed of said revolving unit.

3. A device of the type described comprising a shaft, means for rotating said shaft, a revolving unit disposed upon said shaft, an arm carried by said shaft, means for rigidly securing said arm to said shaft, resilient means for connecting said arm to said unit, means for varying the movement of said unit with respect to said shaft, said means comprising a cam roller carried by said arm, a cam, and means for actuating said cam for moving said arm with respect to said unit.

4. A device of the type described comprising a shaft, means for rotating said shaft, a unit disposed concentric with said shaft, arms carried by said shaft, resilient means for securing one of said arms to said unit, a cam roller carried by the other of said arms, a hammer member also carried by the other

arm, a stop carried by said unit and arranged to engage said hammer member, and means for engaging said cam roller for moving said unit with respect to said arms and said shaft.

5 5. A device of the type described comprising a shaft, means for rotating said shaft, a unit disposed concentric with said shaft, arms carried by said shaft, resilient means for securing one of said arms to said unit, a cam roller carried by the other of said arms, a hammer member also carried by the other arm, a stop carried by said unit and arranged to engage said hammer member, and means for engaging said cam roller for moving said unit with respect to said arms and said shaft, said resilient means being adapted to return said unit to the normal position with respect to said arms and said shaft.

6. A device of the character described comprising a casing, a shaft rotatably mounted in said casing, a revolving screen unit disposed in said casing, means yieldingly supporting said unit upon said shaft and means operable by rotation of said shaft to strike said unit periodically and impart a shaking motion thereto.

7. In a machine of the character described, a drive shaft, a drum screen mounted on said shaft, means resiliently securing said screen to said shaft whereby relative angular movement of one relative to the other is permitted, and means for periodically striking said drum a blow in a direction to cause it to rock about said shaft.

8. In a machine of the character described, a drive shaft, a drum screen mounted on said shaft, means resiliently securing said screen to said shaft whereby relative angular movement of one relative to the other is permitted, and means for periodically striking said drum a blow in a direction to cause it to rock about said shaft, said last named means being operated by rotation of said shaft.

9. In a machine of the character described, a drive shaft, a drum screen mounted on said shaft, means resiliently securing said screen to said shaft whereby relative angular movement of one relative to the other is permitted, and means for periodically striking said drum a blow in a direction to cause it to rock about said shaft, said last named means including an arm mounted on said shaft.

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