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WASHER SORTING MACHINE

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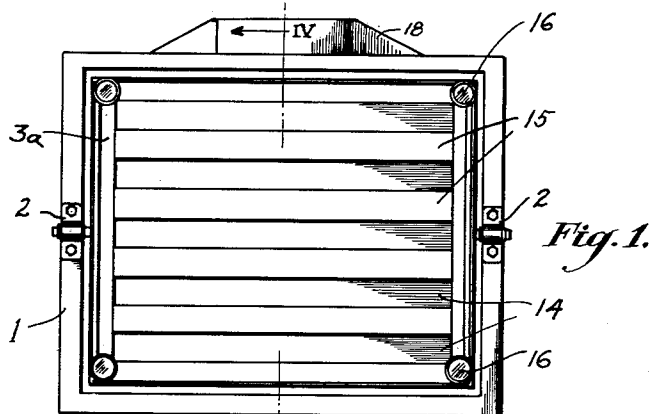


Fig. 2.

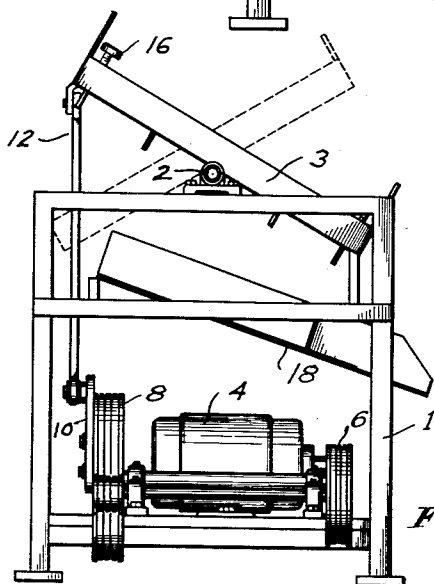
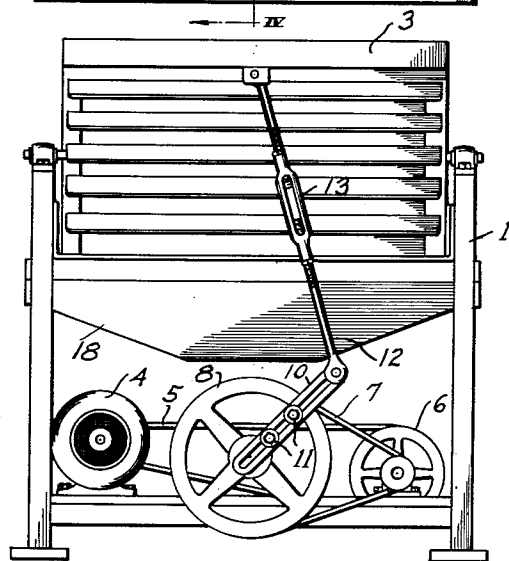


Fig. 3.

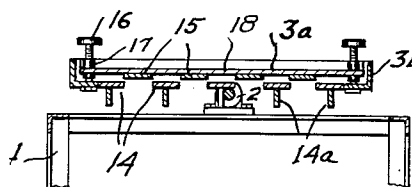


Fig. 4.

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WASHER SORTING MACHINE

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This invention relates to a washer sorting machine, although it has general usefulness in sorting other objects of predetermined maximum size, such as coins, metal parts and similar objects.

After metal washers are galvanized or plated there is a great tendency for some of the washers to stick together, which is very objectionable from the standpoint of purchasers of the washers. While sorting machines for passing objects below a predetermined size are known in the art, these are not generally suitable for sorting washers from those that stick together, furthermore they have the disadvantage of being complicated in construction and expensive to manufacture.

An object of my invention is to provide a novel washer sorting machine which is devoid of the above named disadvantages.

A more specific object of my invention is to provide a washer sorting machine which is readily adjustable to sort different sizes of washers and which is so constructed so as to agitate the washers sufficiently so as to separate those of proper size from those of improper size or which are stuck together.

Other objects and advantages of my invention will become apparent from a study of the following description taken with the accompanying drawings wherein:

Figure 1 is a top view,

Figure 2 is a side elevational view,

Figure 3 is a front elevational view of a washer sorting machine embodying the principles of my invention and Figure 4 is a transverse cross-sectional view taken along line IV—IV of Fig. 1.

Referring more particularly to the drawing, numeral 1 denotes a frame on which is supported a pair of bearings 2 which pivotally mount an open bottom tray 3 for oscillatory movement. Such movement is provided by means of an electric driving motor 4 which drives a belt 5, pulley 6, belt 7 and another pulley 8. Of course other drive means for oscillating tray 3 may be used instead. Pulley 8 is connected to tray 3 by means of an adjustable linkage comprising a slotted link 10, through the slot of which bolts 11 fasten it to pulley 8. Pivotal mounted on the end of link 11 is a link 12 of adjustable length, which adjustment is obtained by turnbuckle 13. The opposite end of link 12 is pivotally connected to one side of tray 3.

In tray 3 there is mounted a sorting device comprising two vertically spaced grids 14 and 15, the latter of which is vertically movable relative to grid 14 by means of adjusting screws 16 which are threaded secured to sleeves 17 rigidly fastened to bars 18 onto which the upper grid 15 is rigidly secured. As will be more apparent in Figures 1 and 4, the top grid 15 comprises a plurality of parallel steel bars, such as $\frac{1}{4}$ " x $3\frac{1}{2}$ " bars, located in the same horizontal plane, the ends of which bars are rigidly welded to a rectangular frame 3a. Similarly the lower grid 14 comprises a plurality of spaced parallel bars of the same size and in the same horizontal

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plane but vertically spaced from grid 14 which are stationarily mounted with respect to angle irons 3b which form part of the tray 3. The ends of the bars of grid 14 are welded to the edges of the horizontal flanges of angle irons 3b and the ends of the supporting bars 14a are welded to the underside of said flanges. Grids 14 and 15 are staggered and vertically spaced so that the top grids 15 overlie the spaces between the bottom grids 14. And by turning the adjusting screw 16, the top grid 15 may be adjustably moved either closer to or farther from the stationary bottom grid 14 whereby the grids are adjusted to accommodate different sizes of washers or similar objects.

Immediately underneath the tray 3 is located a chute 18 which is inclined so that washers dropping thereon will slide down by gravity into a container (not shown) located at the bottom of the chute.

In operation, the motor 4 drives pulleys 6 and 8, therefore the adjustable links 10 and 12, which act as a crank, will impart oscillatory movement on tray 3 between the position shown in full lines and that shown in dash lines. Thus the washers which have been poured into tray 3 through the spaces in top grid 15 will be oscillated in pan 3. Only washers of a thickness less than the distance between grids 14 and 15 will slide to positions immediately underneath the bars of grid 15 so as to be discharged through the spaces between grid 14 onto the chute 18. Washers which are stuck together so as to form a double or triple thickness will be unable to slide underneath the bars of grid 15, but will remain in the spaces between such bars during the oscillatory movement. Therefore, after a number of oscillations, washers of proper thickness will pass through the sorting machine and rejects will be retained thereby so that they may be finally picked or withdrawn by the operator.

It will be apparent that any other well known form of adjusting means may be used for vertically adjusting movable grid 15 relative to stationary grid 14. Also, the grids 14 and 15 may be arcuate or even circular in the form of two concentric squirrel cages, instead of being flat, in which instance the squirrel cages may be rotated directly by motor 4. Similarly other changes will readily become apparent to those skilled in the art, such as making the grids round or tubular.

Thus it will be seen that I have provided an efficient washer sorting machine for separating washers which are stuck together, or which are oversize, from those of proper size, which machine is also useful for sorting other objects, such as coins and the like; furthermore I have provided a washer sorting machine that provides sufficient agitation or oscillatory movement so as to effectively force therethrough, washers or objects of proper size and retain those of abnormal size; furthermore I have provided a sorting machine including vertically spaced grids which are spaced apart in an adjustable manner to enable quick change of the distance between grids for sorting different sized objects.

While I have illustrated and described a single specific embodiment of my invention, it will be understood that this is by way of illustration only, and that various changes and modifications may be made within the contemplation of my invention and within the scope of the following claims.

I claim:

1. A machine for sorting washers or other objects of predetermined thickness, comprising a tray for receiving such objects, pivotal means having a horizontal axis for pivotally mounting said tray, means for effecting oscillation of said tray in a vertical plane about said pivotal mounting, said tray including a bottom wall formed of a pair of vertically spaced grids of rectangular cross-section, each comprising horizontally spaced straight

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bars having flat surfaces, the bars of the upper grid of said pair overlying the spaces between the bars of the lower grid and being in a horizontal plane vertically spaced from that of the lower bars so that objects can slide between and parallel to said grids as the result of said oscillation of the tray, whereby only objects which can fit in the space between the upper and lower grids will fall through the spaces of the lower grid.

2. A machine as recited in claim 1 together with means for vertically adjusting said upper grid so as to vary the distance thereof from the bottom grid to selectively sort objects of different thickness.

3. A machine for sorting washers and other flat objects of predetermined thickness comprising a frame work, a tray having opposed bearings substantially centrally of opposed sides thereof and supported on said frame work, drive motor means including an adjustable crank arm for oscillating said tray through variable, predetermined arcs of movement in a vertical plane, said tray including a first grid formed of straight parallel bars of rectangular cross-section disposed in a horizontal

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plane and a second grid also comprising spaced parallel bars of rectangular cross-section in a single horizontal plane, spaced above said afore-mentioned plane, the bars of said second grid overlying the spaces between the bars of said first grid, screw threaded means for vertically adjusting said second grid to vary the vertical distance between said grids, whereby objects of predetermined thickness may be sorted and pass therebetween, and a chute stationarily mounted underneath said tray and inclined downwardly so that objects falling thereon from the spaces between the bars of the first and second grids may be slid into a receiver.

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