June 13, 1967 O. L. KINDIG 3,325,006

SORTING AND CLASSIFYING MACHINE FOR PINTLE PINS AND THE LIKE

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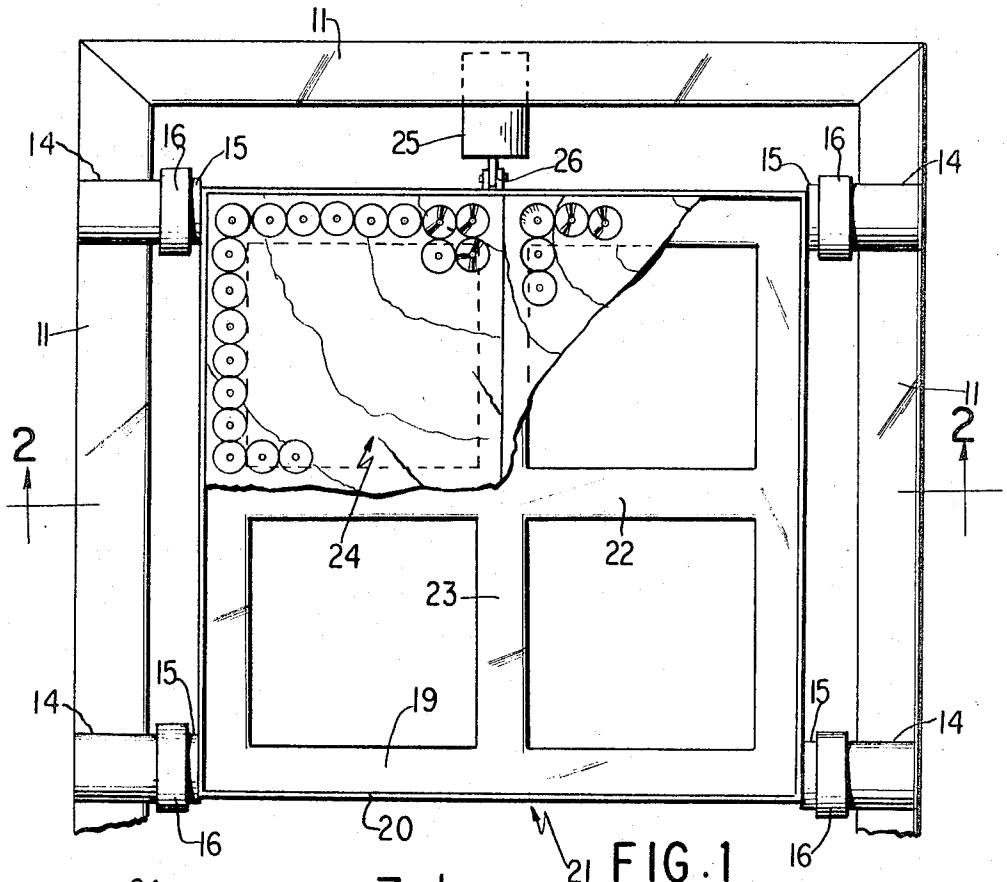

FIG. 1

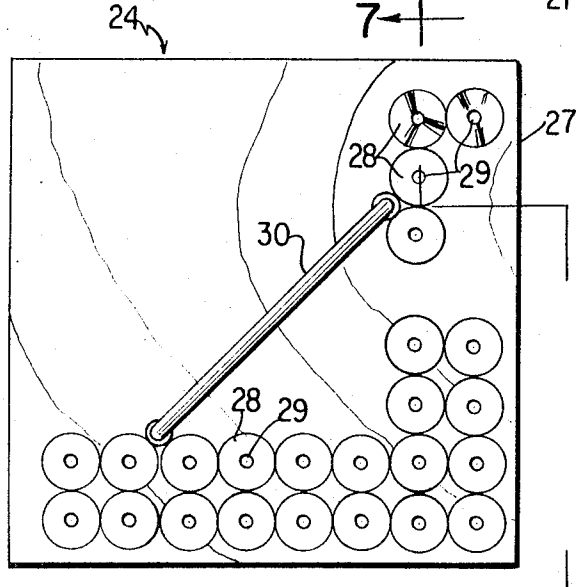

FIG. 6

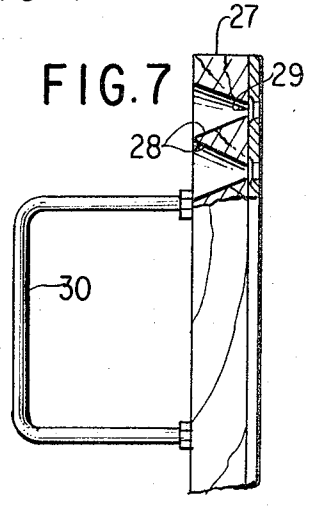

FIG. 7

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FIG. 2

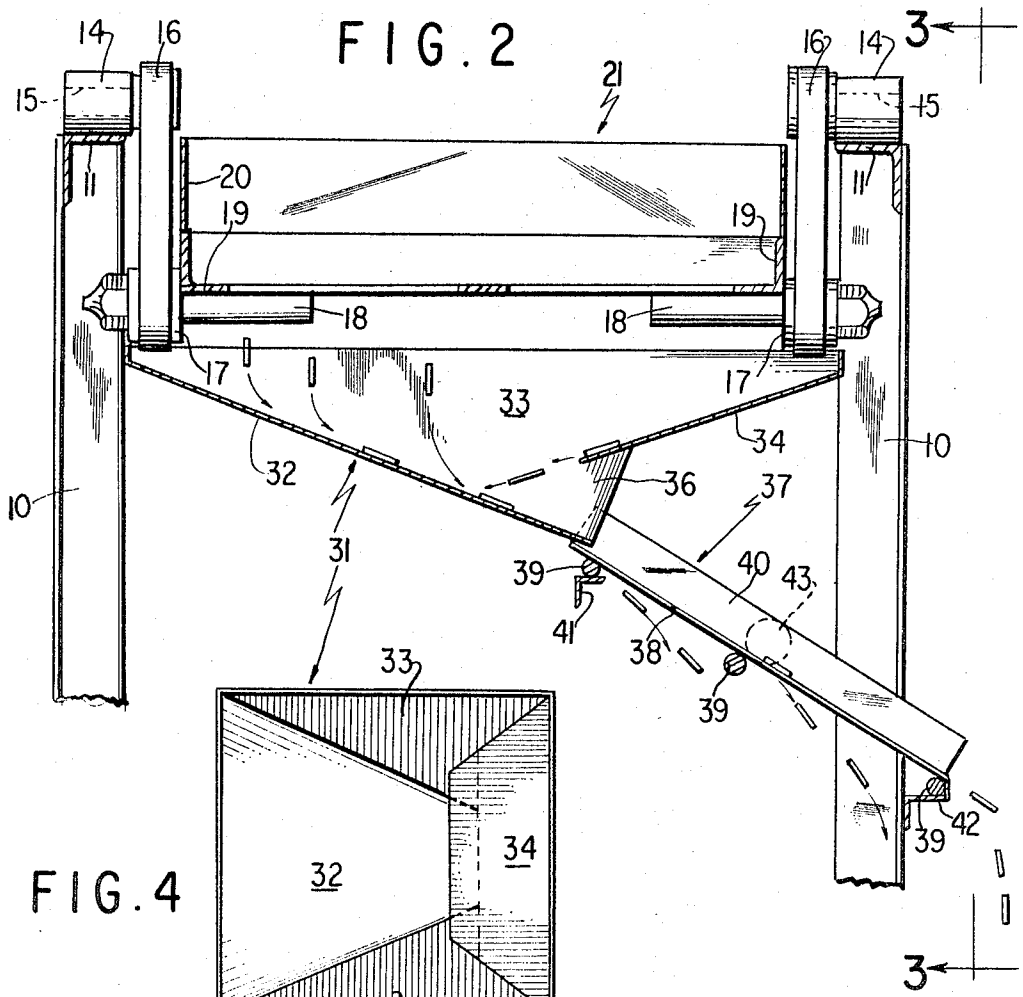

FIG. 4

FIG. 5

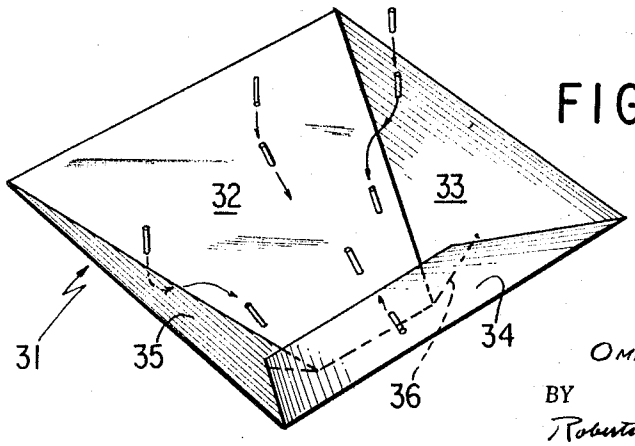

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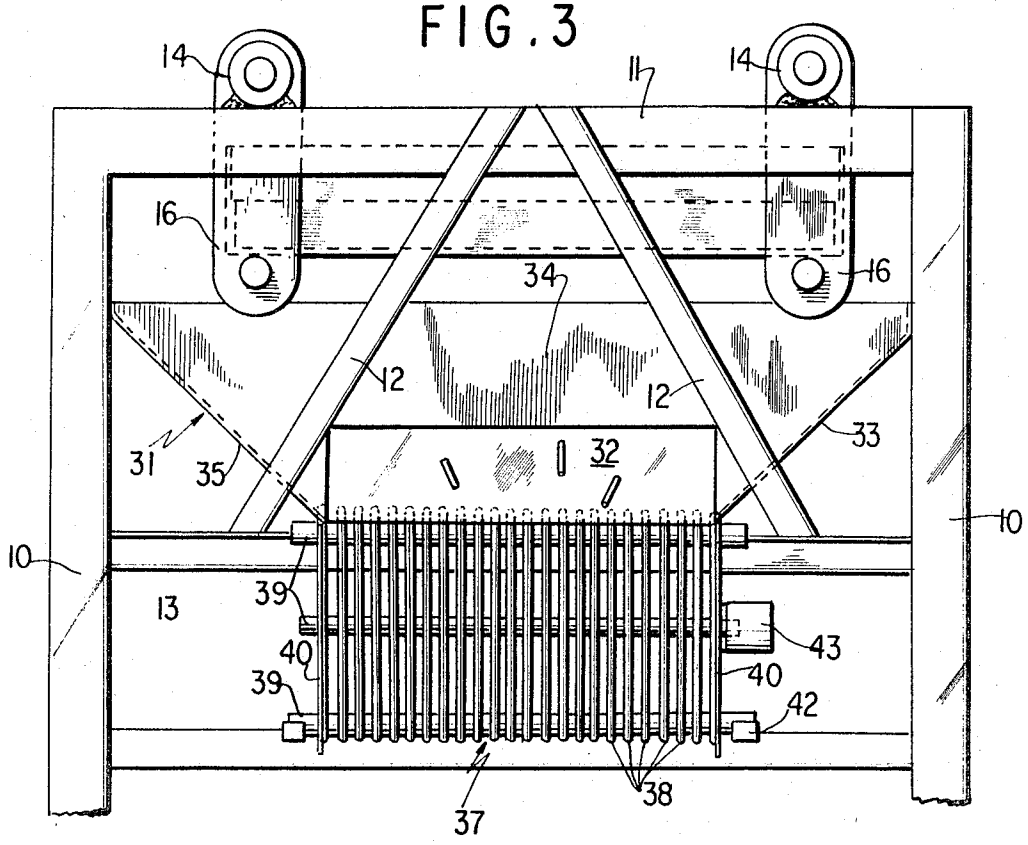
FIG. 3



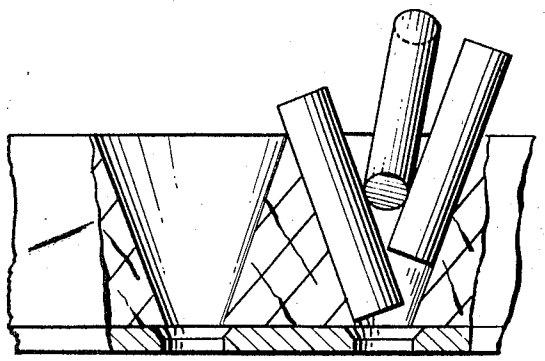


FIG. 8

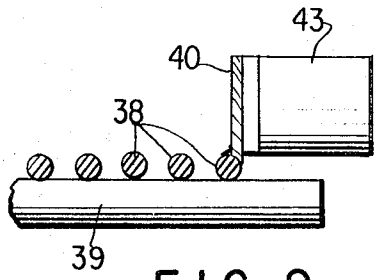


FIG. 9

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3,325,006

SORTING AND CLASSIFYING MACHINE FOR PINTLE PINS AND THE LIKE

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2 Claims. (Cl. 209—85)

This invention relates to sorting apparatus and particularly to an improved sorting apparatus for pintle pins.

Pintle pins are cylindrical elements used to connect succeeding links of sprocket chains. The tolerance on such pins is quite close, and they are used by the hundreds of thousands. Obviously, therefore, the sorting and classifying of such pins as to undersize, acceptable and oversize becomes a problem.

The principal object of this invention is to provide a sorting and classifying apparatus that will effectively sort pinle pins and the like into three main classifications, i.e., undersized, acceptable, and oversized.

Another object of the invention is to provide such a sorting and classifying apparatus in which the pins are initially oriented prior to passing over a grating mechanism for classifying the pins.

Still another object of the invention is to provide such a sorting and classifying apparatus in which a vibratory orienting device is provided that facilitates the orientation of the pintle pins.

In one aspect of the invention, a vertical frame may support at each corner of its top a pivotally mounted crank arm, the opposite ends of which include inwardly directed bars for supporting a cage. The cage may be provided with compartments for receiving trays holding pintle pins in random order.

In another aspect of the invention, each tray may include a base having conical passages therethrough for orienting the pintle pins such that their longitudinal axes are substantially vertical as they pass through the conical openings. The size of the conical passages is such that only undersized and acceptable sized pintles pass through them, the oversizes pintles being retained on the tray.

In still another aspect of the invention, a reciprocating or other type of vibrator may be mounted on the frame and connected to the cage to impart to it a vibrating motion as the crank arms are oscillated about their pivots, such vibrating action causing the randomly arranged pintle pins to feed vertically through the conical passages in the base.

In another aspect of the invention, inclined chute means may be provided beneath the vibratory cage for receiving and guiding the falling pintle pins onto an inclined classifying grate. The construction of the chute means is so angularly arranged that the pintle pins move along the chute onto the grate with their longitudinal axes remaining substantially parallel to the direction of movement.

In still another aspect of the invention, the inclined grate may include parallel spaced, cylindrical rods arranged parallel to the direction of motion of the pintle pins. The spacing of the rods is such as to pass undersized pintle pins, causing those of acceptable size to pass down the grate, falling off its lower end into a hopper.

The above, other objects and novel features of the invention will become apparent from the following specification and accompanying drawings which are merely exemplary.

In the drawings:

FIG. 1 is a top plan view of a sorting and classifying machine to which the principles of the invention have been applied;

FIG. 2 is a sectional elevational view taken substantially along line 2—2 of FIG. 1;

FIG. 3 is an end elevational view looking in the direction of the arrows along line 3—3 of FIG. 2;

FIG. 4 is a top plan view of a chute forming a detail of the invention;

FIG. 5 is a perspective view of the chute shown in FIG. 4;

FIG. 6 is a top plan view of a tray forming a detail of the invention;

FIG. 7 is a section taken substantially along line 7—7 of FIG. 6; and

FIGS. 8 and 9 are details of the invention.

Referring to the drawings, and particularly to FIGS. 1, 2 and 3, the principles of the invention are shown as applied to a sorting and classifying apparatus comprising four upright standards **10** at the top of which angle members **11** are attached forming a framework that is suitably reinforced by strut members **12** and **13** (FIG. 3).

Bearings **14** may be fixed to angle members **11** for journaling shafts **15** that have one end of a link **16** fixed thereto. The links **16** depend from shafts **15** and support bearings **17** that journal shafts **18** therein. Shafts **18** may be rigidly attached to the bottom of angle irons **19** that form, with an integral skirt **20**, a basket means **21**. Cross members **22**, **23** (FIG. 1) form four openings adapted to receive tray means **24** thereover.

A cylinder **25** is fixed to the framework and it includes a piston having a rod **26** that is connected to basket means **21** for reciprocating the same at a rapid rate. Of course, other virbating means such as crank means may also be employed to vibrate the basket means **21**.

Referring to FIGS. 6 and 7, tray means **24** may comprise a relatively thick plate means **27**, which in the embodiment disclosed is shown as made of hard wood or other suitable material. The plate means **27** may be provided with a plurality of conical passages **28** terminating in holes **29** that will be of a diameter to pass pintle pins having an acceptable as well as an undersized diameter. Pintle pins of an unacceptably large diameter will remain in the tray means **24**. Each tray means may include a handle **30** for facilitating its placement and removal within the basket means **21**.

A chute means **31** may be mounted within the framework formed by the uprights **10**. It may include inwardly declined surfaces **32**, **33**, **34** and **35**. The surface **34** is shorter than surface **32**, providing an exit **36** through which the pintle pins slide after they are directed by surfaces **33**, **34** and **35** onto surface **32**.

The exit **36** may lead onto a grate **37**. Grate **37** may include a plurality of parallel, spaced bars **38** mounted on several parallel, spaced rods **39**, and sides **40** may be located adjacent the end rods **38**. Referring to FIG. 2, the top rod **39** may be mounted on an angle **41** for sliding movement therealong; and the bottom rod **39** may be mounted on a Z-rod **42** at a substantially lower elevation than angle **41**, the latter being located at the elevation of the exit **36** from chute **31**.

Vibratory means **43**, similar to the means **25**, may be mounted on the frame and connected to grate **37** for reciprocating it transversely of the path of flow of pintle pins thereover.

In operation, trays **24** filled with randomly arranged pintle pins are loaded in basket means **21** over the passages formed by cross members **22**, **23**. The vibrator **25** is activated, causing rapid vibration or reciprocation of basket means **21** by the oscillation of links **16**. The acceptable sized pintle pins as well as the undersized ones pass through the holes **29**, falling into chute **31** from where they slide down surface **32** and out through exit **36** onto the top of inclined grate **37**. As the pintle pins

move down grate **37** while the latter is being vibrated, the undersized pintle pins pass between bars **38** whereas those of acceptable size descend and fall off the lower end of grate **37**. Hoppers may be provided beneath grate **37** to catch the undersized pintle pins, and hopper means may be provided beneath the lower end of grate **37** to catch the acceptable sized pintle pins.

As each tray **24** ceases to pass pintle pins, it is removed and the oversized pintle pins are emptied into a bin. The tray is again filled with random sized pintle pins and returned to the basket means **21**.

Although the various features of the improved classifying and sorting apparatus have been shown and described in detail to fully disclose one embodiment of the invention, it will be evident that changes may be made in such details and certain features may be used without others without departing from the principles of the invention.

What is claimed is:

1. Apparatus for sorting and classifying pintle pins and the like comprising in combination, a frame, said frame being mounted for reciprocatory movement; basket means mounted in said frame for reciprocative motion therewith; means for reciprocating said frame and basket means; tray means having handle means adapted removably to be mounted within said basket means, said tray means including relatively thick bottom plate means having a plurality of inverted conical passages therein terminating in holes adapted to pass undersized and acceptable sized pintle pins while retaining oversized pins; inclined chute means for collecting said undersized and acceptable sized pintle pins; inclined grate means at the lower end of said chute means including longitudinal parallel bars spaced apart sufficiently to pass undersized pintle pins therethrough while retaining acceptable sized pintle pins thereon, whereby the latter gravitate off the lower end of said grate means; and means for vibrating said grate means.

2. In an apparatus according to claim **1**, wherein said frame and basket means has spaced crank means, and said reciprocating means includes cylinder and piston means at one end of said frame whereby said frame and basket means is reciprocated on said crank means.

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