Dec. 9, 1947. J. O. LE VAN 2,432,319

PERFORATED PLATE APPARATUS FOR COUNTING JEWELS

Filed Dec. 9, 1942 2 Sheets-Sheet 1

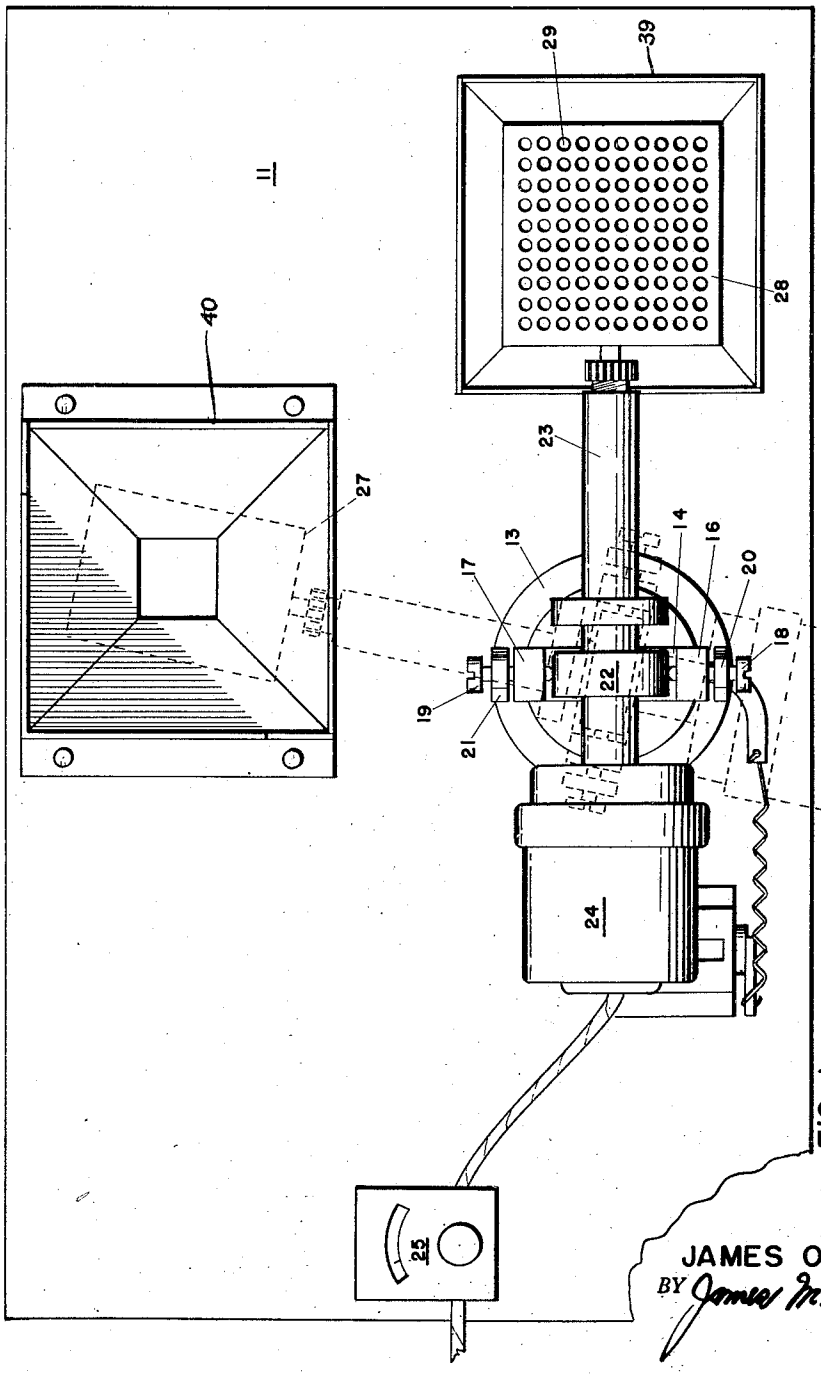


FIG. 1.

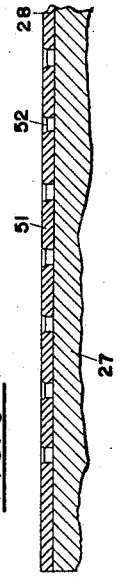


FIG. 5

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PERFORATED PLATE APPARATUS FOR COUNTING JEWELS

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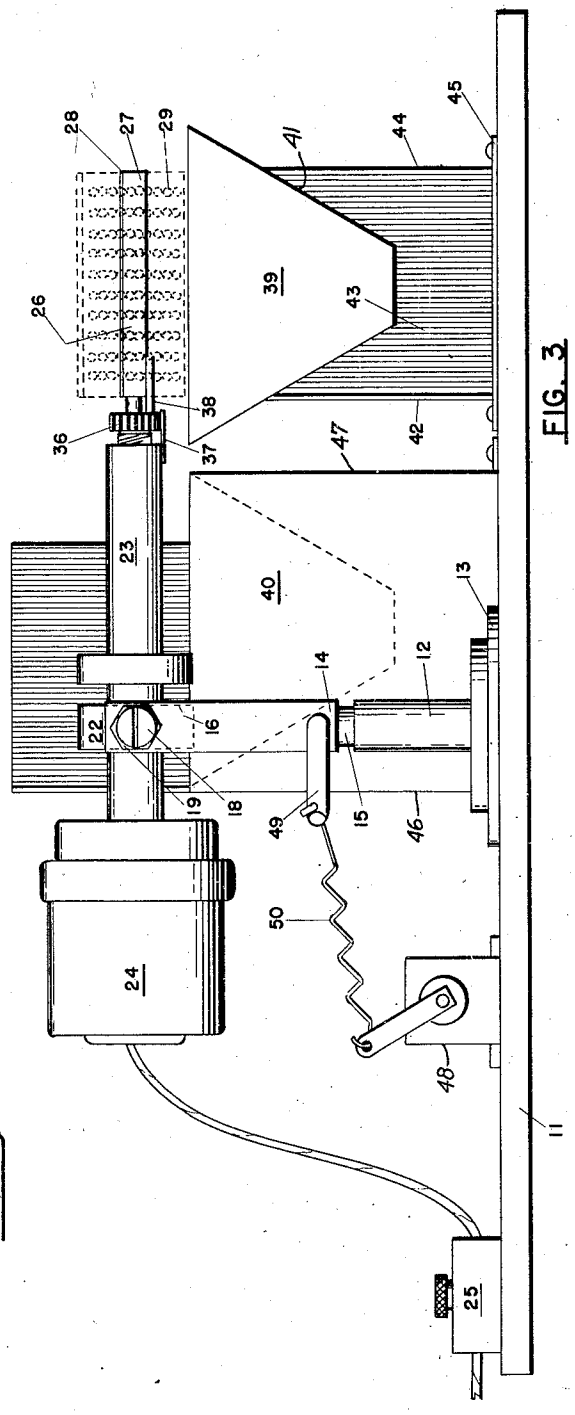


FIG. 2

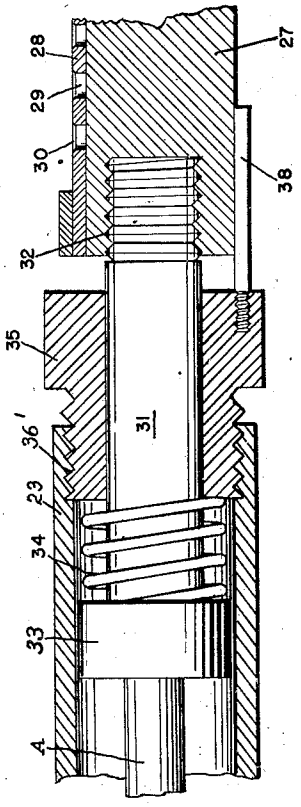


FIG. 3

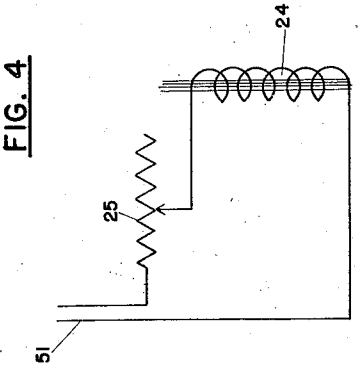


FIG. 4

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2,432,319

PERFORATED PLATE APPARATUS FOR COUNTING JEWELS

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Application December 9, 1942, Serial No. 468,409

2 Claims. (Cl. 209—93)

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This invention relates to a method of counting small objects and the apparatus used in carrying out the method.

In the counting of small objects such as jewels for watches, compasses or like precision instruments great difficulty is experienced in getting an accurate count between the different steps in the processing of the jewels. As these jewels must be counted between each step in their processing, much time is consumed as this counting is done manually at present.

It is the object of this invention to provide an apparatus which when used with ordinary skill and attention will accurately count any small identical objects.

It is a further object to provide an apparatus for counting objects whose mass is negligible.

It is a further object to provide a quick, sure, accurate counting mechanism for watch jewels.

It is a still further object to provide apparatus for counting in multiple units.

It is a still further object to provide an apparatus which will select multiple units of small identical objects, registering the number of such units.

It is a still further object to provide an apparatus which will select small objects of the same diameter and including other objects not smaller than three-fourths of the diameter.

It is a still further object to provide a vibrating selective unit for receiving a desired number of identical objects.

The invention is illustrated in the accompanying drawing in which:

Fig. 1 is a top plan, showing in dotted lines the dumping position.

Fig. 2 is a side elevation, showing in dotted lines the tilt of the vibrator.

Fig. 3 is an enlarged detail of the vibrating plate securing means and the vibration adjusting means.

Fig. 4 is an electric diagram of the apparatus.

Fig. 5 is a view of the vibrating plate showing the relation of the perforation and intervening spaces.

The device as illustrated shows the apparatus mounted on a base 11 which may be of wood, metal or plastic and which supports a standard 12 having a base portion 13 firmly fixed to the base 11.

Rotatably carried in the standard 12 is a yoke 14 with a lower stem 15 and upper arms 16 and 17. Pivot bolts 18 and 19 threaded into the yoke arms 16 and 17 are locked in desired position by locking nuts 20 and 21 which rotatably hold bearing 22. By reason of the rotatably mounted stem 15 the bearing is capable of swinging through 360° in a horizontal plane while the pivot bolt support gives it movement in a direction at right angles to the horizontal plane.

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Slidably carried in the bearing 22 is the tube 23 which extends from the vibrating magnet 24 and houses the vibrating rod (not shown). A resistance unit 25 controls the amount of vibration.

Adapted to be adjustably attached to the tube 23 is a pocketed vibrating plate 26. This vibrating plate is formed from a base plate 27 and a top plate 28 which are secured to each other by any desirable means such as soldering, cementing or the like. The portion of the base plate which contacts the top plate is oxidized or darkened to assist in inspection of the filled vibrating plate. The top plate 28 is perforated with any number of holes 29, here shown as one hundred, but of course adaptable to any desired number. The perforations are spaced (see Fig. 5) by a distance 51 which is greater than the diameter 52 of the perforations to permit the articles to be sorted to pass between said perforations when filled with objects which project above the plate surface. The outer edge of the perforation is beveled at 30 to permit the jewels or small objects to be counted to slide in the pockets thus formed. This beveling 30 also serves to eliminate a second jewel from the perforation when the jewels being graded are thinner than plate 28, the beveled edges allowing the top jewel to slide out. This vibrating plate is highly finished such as chromium plated over a ground surface, polished stainless steel or some similar surface.

A rod 31 is threaded into the base plate 27 at 32 and has an enlarged head 33 adapted to contact the vibrating rod of the magnet 24. A spring 34 fitting loosely over the rod 31 bears against the enlarged head 33 and an adjusting nut 35 which is formed with a threaded portion 36' adapted to be threaded into the tube 23. Adjustment of this nut 35 also controls the vibration of the vibrating plate by varying the tension of the spring 34. The outer surface of the nut portion 35 is fluted at 36 and a spring finger 37 secured to the tube 23 holds the nut in desired position. The nut also carries a rod 38 which extends under the vibrating plate 26 and serves to steady the vibrating plate.

Two funnels are used in the counting operation, an overflow funnel 39 and a receiving funnel 40. The overflow funnel 39 has the regular sloping portion 41 and upright supporting sides

42, 43 and 44 and a base 45. One side is left open to allow an overflow pan or drawer (not shown) to be inserted and catch the overflow from the vibrating plate. The receiving funnel 40 is formed similar to funnel 39 with an open side to receive a drawer or container for the counted objects and has upstanding walls 46 and 47 to prevent spilling of the objects in the dumping operation.

A counting mechanism 48 is attached to the yoke 14 through the pin 49 and spring 50 which relieves the operator of keeping a written or mental remainder of the number of dumping operations.

The diagram in Fig. 4 shows the resistance 25 and vibrating magnet 24 connected to the ordinary current source 51.

In use, the vibrating magnet is set in operation and the amount of vibration adjusted by means of the resistance to approximately that desired. The vibrating plate is positioned over the overflow funnel making sure a pan or drawer is below and a quantity of small identical objects such as watch jewels are poured on said upper perforated plate which is in rapid vibration. By tilting the vibrating plate about a horizontal axis as shown in dotted lines in Fig. 2 or slanting it otherwise the jewels are caused to fill the pockets 29, entrance being made easy by the beveled sides 30. The excess jewels, of course, slide off the vibrating plate into the funnel and end in the pan or drawer, none being lost or scattered. The now filled vibrating plate is swung on the pin 15 and when over the receiving funnel, inverted to dump its counted load of jewels in said funnel. This action causes the register to advance, thus keeping account of the number of dumpings which multiplied by the number of pockets on the vibrating plate gives the total count.

The operator must, of course, make a visual examination to be sure the pockets are filled. This examination also serves to grade the jewels for, as sometimes happens, should there be a smaller jewel in one of the pockets, the dark outline about the jewel makes it stand out as a smaller jewel and it can be removed by hand while, of course, larger jewels are rejected by the vibrating plate itself. The amount of vibration may be adjusted at this time to a fine point by the operator simply by turning the tube 23 while holding the vibrating plate stationary. This amount is determined by the performance of the jewels on the vibrating plate.

The use of different size vibrating plates having different size or/and number of pockets is, of course, part of the apparatus which is here shown only with one. This difference in mass of the vibrating plate is what makes it necessary to have an adjustment in the magnitude of the vibration.

In experimental use with this apparatus one operator does the work of eight formerly used in manual counting. It is, therefore, a practical method of counting very small identical objects, accurately and with speed, something which up to the present no apparatus has accomplished.

What is claimed is:

1. A counting apparatus for watch jewels comprising an upright standard, an overflow hopper, a receiving hopper, a support pivotally mounted on said upright standard, a perforated plate having a darkened underlying base plate carried on said support and adapted to be selectively positioned above either of said hoppers and means for vibrating said plate.

2. A counting apparatus for watch jewels comprising an upright standard, an overflow hopper, a receiving hopper, a support pivotally mounted on said upright standard, a perforated plate carried on said support and adapted to be selectively positioned above either of said hoppers, means underlying said perforated plate to clearly designate when said perforations are filled, and means for vibrating said plate.

JAMES OLIVER LE VAN.

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