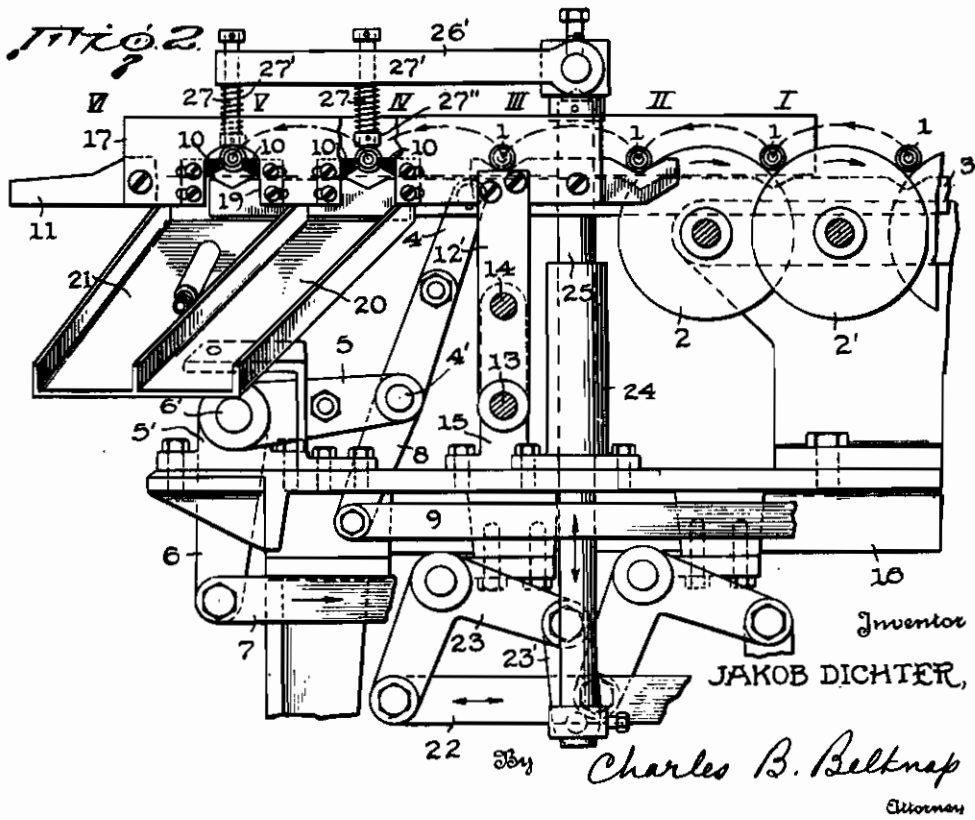
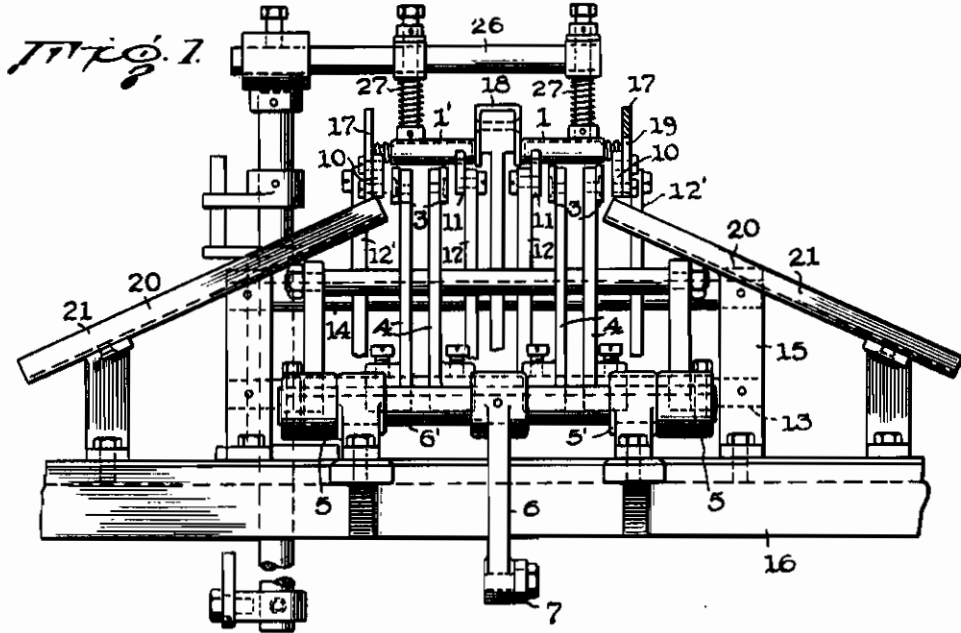


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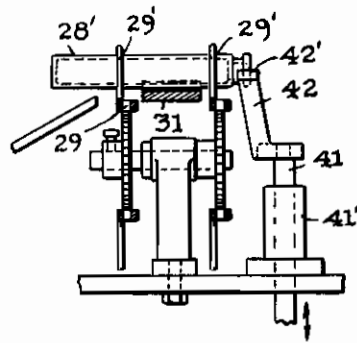
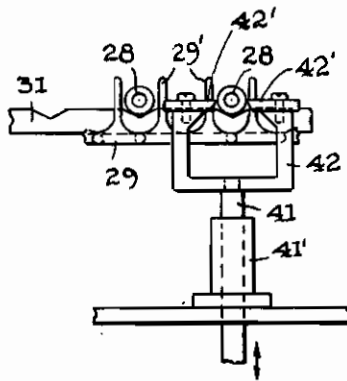
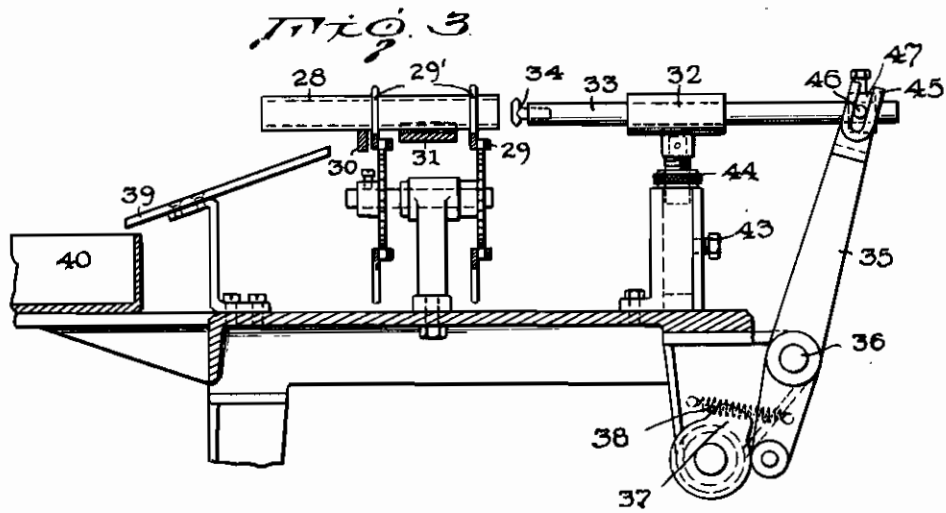
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SORTING MACHINES

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The present invention relates to apparatus for gauging cylindrical glass tubes, the necks of vials, and similar glass articles, both interiorly and exteriorly, and for sorting the articles to separate those having incorrect measurements from those the measurements of which are those desired for particular uses. Many glass receptacles in use at the present time are provided with either external or internal screw threads to accommodate threaded closures, the latter being applied to the receptacles by machine. Other types of receptacles are closed by means of rubber plugs which may be forced inwardly of the receptacle to function as pistons and thus expel the contents therefrom. It is important that the diameters of the receptacles and the threads thereon be kept within predetermined limits to insure an accurate fit of the cooperating closures and plugs.

This invention has for one of its objects the provision of gauging devices designed to reject articles having incorrect dimensions and the separation thereof from articles having the desired predetermined measurements.

Another object of the invention is to provide conveying mechanism of such a character that it can be associated with glass shaping machinery now in use and permit gauging without removing the articles from the shaping apparatus to another machine.

Other objects will be apparent from the following description of the invention taken with the accompanying drawings, in which

Fig. 1 is an end elevation of the measuring apparatus, parts thereof being broken away;

Fig. 2 is a side elevation, partly in section, of the apparatus illustrated in Fig. 1;

Fig. 3 is an end view of a modified form of the invention; and

Figs. 4 and 5 are fragmentary side and end view respectively of still another form of measuring device.

In the drawings vials 1, 1', are supported on adjacent rollers 2, 2', the perimeters of which overlap, during the usual heating and shaping steps. A conventional transfer mechanism consisting of notched racks 3, having a vertical as well as a horizontal reciprocatory movement, transfers the vials from one set of supporting rollers to an adjacent set of rollers, that is from one processing station to the next station. The combined reciprocatory movements of the transfer rack are obtained through arms 4 each connected at one end to the rack and having its other end fast on shaft 4'. Also fast on shaft 4'

is an arm 8 to which is pivotally connected the connecting link 9, the latter being adapted for reciprocation by suitable cam means (not shown). Journaled in bearings 5' secured to the frame 16 of the machine is a shaft 8' to the latter of which are secured arms 5 and 6. Connecting link 7, adapted to be reciprocated by a suitable cam (not shown) is pivotally connected to arm 6. In Fig. 2 the arrows and dotted lines above the racks indicate the manner in which the vials are lifted and transferred a distance equal to that between adjacent rollers by the combined vertical and horizontal reciprocation of the transfer rack.

As will be seen in Figs. 1 and 2, a pair of longitudinal notched racks are supported by standards 12, the latter being slidably mounted on rods 13 and 14 and adjustable transversely thereon to accommodate vials of different lengths. The rods 13 and 14 are supported by posts 15 which in turn are fixed to the frame 16. Also mounted for slidable movement on rods 13, 14, and adjustable thereon, are standards 12' supporting guide plates 17 which, together with fixed guide 18, position shaped vials with respect to the gauging devices hereinafter described.

Referring to Fig. 2 it will be seen that plates 17 are provided with two or more recesses, as at 19, and that there are adjustably fixed to plate 17 on opposite sides of the recesses gauging members or fingers 10. Stations I, II and III are processing stations while stations IV and V are gauging or sorting stations. The fingers 10 at station IV, for instance, are spaced a distance slightly less than the diameter desired for the threaded necks of the vials. If the threaded necks are less than the desired or predetermined gauge the vials are permitted to pass the gauge at station IV. The fingers at station V, on the other hands are accurately spaced to permit only those vials having threaded necks of the proper diameter to pass therethrough. Should the necks be larger than the desired size they will be conveyed beyond station V to station VI along racks 11, from which they may be removed by the attendant. It will be seen that inclined chutes 20, 21, permit the vials sorted at stations IV and V to be delivered to suitable containers.

To insure passage of the vial between the gauge fingers suitable pressure mechanism is employed. This mechanism comprises a cam operated reciprocating link 22 operating through bell-crank 23 and link 23' to lower and elevate rod 25 slidable in bearing 24. Fixed to rod 25 is a transverse arm 26 to which are fastened longitudinally ex-

tending arms 26', each of the latter being apertured to accommodate pressure pins 27. These pins are freely slidable in arms 26' but are urged downwardly by springs 27' bearing against collars 27'' on the lower ends of the pins and against the arms 26'. Springs 27' are readily yieldable but are sufficiently heavy to tilt those vials capable of passing the gauge fingers. On the other hand they yield when the vial is too large to pass the fingers. It will therefore be apparent that the vials will be sorted according to their deviation from a predetermined size, first the undersize vials being separated from the others, then the desired size, and finally the oversize receptacles are removed.

The foregoing description has been specific in that a particular type of vial, viz: those having exteriorly threaded necks, has been illustrated. The mechanism is also adapted for gauging interior threads as well as smooth surfaces. In Fig. 3, for instance, the gauging apparatus is modified to sort plain tubular blanks according to their internal diameters. In this form of the invention the blank 28 is so supported that a slight movement of the vial in an axial direction will unbalance the blank and permit it to tilt, whereupon it will fall into a suitable receptacle. As illustrated in this figure, the conveying means comprises a sprocket driven chain 29 having pegs or fingers 29' thereon. Preferably, the chain is driven intermittently. The blanks are supported by plate 30 and notched bar 31, the notches in the latter accurately positioning the blanks with respect to the gauging device. The latter consists of a gauge member 34 held in the reciprocable rod 33 slidable in bearing 32. The bearing is adjustable horizontally as well as vertically, set

screw 43 and nut 44 being provided for this purpose. Lever 35 fulcrumed at 36 is adapted to be rocked by cam 37, spring 38 normally urging one end of the lever toward the cam. The other end of lever 35 is provided with a yoke 45 which cooperates with pin 46 on collar 47, which is adjustable on rod 33. A plurality of spaced gauge members, each a different size, move toward the blanks during the operation of the gauging apparatus. Obviously, if the gauge member is larger than the internal diameter of the blank the latter will be moved axially until it tilts and falls onto slide 39 from which it falls into basket 40. In this manner the blanks may be successively sorted into two or more sizes.

In Figs. 4 and 5 is shown still another form of the invention. The vials 28' are conveyed to the several gauging members or fingers 42' by mechanism similar to that illustrated in Fig. 3, that is, chain 29, and fingers 29', and they are supported on notched rack 31. Rod 41, slidable in bearing 41', is reciprocated by any suitable means, and supports at its upper end a two-armed bracket 42 on which are adjustably fixed gauging fingers 42'. It is to be understood that there is a plurality of pairs of fingers, each pair being spaced a distance differing slightly from the next adjacent pair. It is apparent that the first set of fingers, being spaced more closely than succeeding pairs, will tilt the oversize vials. The next set which are spaced a distance very little less than the desired diameter of the vial, will tilt those vials shaped to the required diameter but not the undersize vials. In this manner the vials are separated into the three groups mentioned.

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