

UNITED STATES PATENT OFFICE

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ADJUSTABLE TOLERANCE GAUGE

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6 Claims. (Cl. 33-169)

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This invention is a vernier height gage.

In machine-shop mass production of work pieces or structural part production it is the practice to subject each piece or part, in process, to a manual checking step or as it is called the "go or no go" test as to whether a piece is over prescribed maximum dimension or is under the prescribed tolerance limit.

It is therefore the cardinal purpose of this invention to provide a simple, practical, substantial, low cost and easily manipulated vernier height gage device providing features adjustable as to a bed plane surface, to prescribe the given maximum dimension in one direction (height) of the piece to be tested and to prescribe the tolerance minus dimension of the height of the piece.

Particularly an intent of the invention is to provide a height gage tolerance height arm and a maximum dimension shoe adjustably mounted on the said arm for instant adjustment to its desired position after the effective piece-contacting face of the arm has been set at a height, as to the bed surface, which allows for the tolerance dimension below the maximum given for an element or piece being test calibrated. In this connection, an object is to provide means connecting the shoe to the arm and operative to automatically retract the shoe when it is free on the arm to an idle position and permitting easy manual shift and set of the shoe to maximum height indicating position.

The invention resides in certain advancements in this art as set forth in the ensuing disclosure and has, with the above, additional objects and advantages as hereinafter developed and whose constructions, combinations and sub-combinations and details of construction and manner of operation, and functions, will be made manifest in the following description of the herewith illustrative embodiment; it being understood that modifications, variations, adaptations and equivalents may be resorted to within the scope, spirit and principles of the invention as it is claimed in conclusion hereof.

Figure 1 is a side elevation of the gage as in use on a bed or table, plane surface for height of piece test.

Figure 2 is a vertical cross-section on line 2-2 of Fig. 1.

Figures 3 and 4 are side and end views, respectively, of a modification.

The disclosure concerns that type of vernier gage having a base 2 to be lodged on a plane surface S of any appropriate supporting structure and which base has a vertical column 3 along

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which is vertically adjustable a slide 4 to be set at a desired calibration in a height measurement range.

For the purpose of this invention there is provided a stiff arm 5 having a plane bottom edge or face 5f to be lodged on a lateral bracket part 4b of the slide and be fastened thereto by set screw clamp 6 to secure the arm in useful horizontal position ready for piece test of pieces on the surface S.

In use of the arm its contact face 5f is adjusted above the surface S to a vernier height indicative of the minimum tolerance or "go" limit of a given piece P on the surface S; for instance the face 5f is set at 2.980" for a tolerance of .020" on a 3" maximum piece.

A maximum dimension gage shoe 10, having a bottom contact face 10f which is plane and horizontal, is slidably mounted on the outer end of the arm 5 and this is provided with an upwardly and outwardly inclined face 5i against which slides a complementary face 10f of the shoe which here is of an acute triangular form in side elevation with its apex toward the arm face 5f. The shoe may be mounted and fixed on the arm for desired adjustment in any desired or appropriate manner.

In this disclosure the shoe is rigidly combined with a saddle 11 which overhangs an upwardly bent part 5b of the arm and has a set screw 12 whereby to clinch the shoe snugly against its guide face 5i. Preferably a wear taking shim 13 is interposed between the screw and the shoe to avoid objectionable scoring of the shoe at area of contact under the screw.

The shoe is automatically shifted inward on the arm when loosened from the screw by tension of a spring 13' which is connected to the arm and to the shim 12, for example.

For test of a 3" piece the shoe is set on the arm so as to be that distance from the surface S and the arm is set at 2.980". Pieces are rapidly, successfully processed at the previously set gage arm and shoe by merely lodging each piece on the surface S and under the shoe. Pieces that are too high to get under the shoe and pieces that pass under the arm are rejects as not coming within the clearance tolerance of .020".

A facile manner of setting the shoe back (outward) on the arm is to rest the arm face 5f on the surface S and then to slide the shoe down onto a thickness gage blade of the desired clear tolerance factor.

The modification shown in Fig. 3 includes a bar 5m having an inclined, T-section guide chan-

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nel 5c in its outer end and in this channel there is slidably guided a triangular shoe 10m having a T-section head 10h complementary to said T-channel. The bottom plane face of the shoe 10m is adapted to be shifted outwardly and outwardly along the bar 5m to a given tolerance distance back from and parallel to the plane bottom face of the bar 5m. The operational function of this form of the gage arm device is the same as with Figs. 1 and 2. The principle is the same but the embodiment is an adaptation different from the device of Fig. 1.

To facilitate assembly of the shim 13 in the saddle 11 a nut bar 14 is interposed between it and the top wall of the saddle and the screw 12 threads into the bar 14 and engages the shim.

Figure 5 shows an embodiment in which the shoe 10x has an L-branch 10' resting against a right angle limb 5' of the bar 5x; the shoe being readily adjustable to shift its plane bottom face to a desired outward position with respect to the plane bottom face of the bar 5x for a tolerance clearance test of work or other pieces.

It is understood that the disclosed principle of construction and function is capable of use in combination with various adjustable tolerance gages.

What is claimed is:

1. A vernier height gage comprising, in combination: a column, a reach arm extending horizontally from a side of the gage column and having at an angle to its bottom face an upwardly directed guide face, a gage shoe slidably fitted and bearing on said face, and means for rigidly fixing the shoe at a desired position of adjustment along the guide face; the bottom of the shoe constituting a horizontal work or piece contact plane and the exposed portion of said guide face constituting a stop shoulder for given work pieces, being inspected, passable under the said shoe bottom if said pieces are within a given tolerance as determined by a setting of said shoe back from the bottom face of said arm.

2. The gage of claim 1; said means including a saddle mounted on and slidable along the arm and having a set screw for fixing the adjusted shoe.

3. The gage of claim 2, and means connecting the saddle to the arm and automatically pulling the loosened shoe in one direction on the arm.

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4. The gage of claim 1, and spring means connecting the shoe to the arm for automatically shifting the loosened shoe in one direction.

5. A vernier gage arm having an upwardly directed end and guide face portion and a height dimension shoe slidable and fixable along said portion and bearing on its said face and having a plane, bottom gaging face; said arm having a plane bottom with respect to which the said face of the shoe is recedably adjustable to various positions indicative of tolerance dimensions of pieces which are to be size tested by the gage; the exposed portion of the guide face constituting a stop shoulder for work pieces within the tolerance limit; said portion consisting of an upwardly bent part of the arm, and a saddle riding on said part and to which the shoe is rigidly fixed, and a holding device on the saddle for retaining the saddle and the shoe at a desired tolerance adjustment on the arm.

6. A reach arm and a column on which it is vertically adjustable, for a vernier height gage, said arm having a plane bottom face at a right angle to said column and a shoe part slidably mounted on said arm and having a plane bottom face parallel to and adjustable toward or from the plane of the bottom face of said arm to a given piece size tolerance measurement so that a given piece oversize in dimension will not pass under the adjusted shoe and, if undersize, will pass under said arm, and means to affix the tolerance adjusted shoe on the arm, one end face of the arm constituting a stop shoulder for work pieces within the tolerance; said arm having an upwardly inclined face part which is channeled and said shoe slidably fitting in the channel.

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