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A FORMATION OF A DIMENSION QUALIFICATION MACHINE

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ABSTRACT
The present invention is a measuring machine wherein the part inserted from reliving point in an adapting tool that is surrounded by the rotated die by means of gearing arrangement having the shape of the part that has to pass from said die for OD measurement and in case of ID measurement, the dimension or threads are engraved on OD stationary tool. As the part qualifies to the measurement standards set by the user the first jaw opens to allow the part to measure as an accepted part and counted by a sensor configured with said clamping jaw to count as qualified quantity else hold as rejected that can be removed manually. Said process of measurement is continuous until the specified batch size completes. Said batch completes a second clamping jaw open and first clamping jaw close to passing said batch of accepted parts to accepting tray to dispatch.

Keywords: Adapting tool, clamping jaw, Accepting tray.

1. Introduction

Measuring the dimension of a component or part of a machine was always a crucial task and any minor measurement error can cause faulty manufacturing or serious issue to complete assembly or make part or assembly not fit for work. In this series, the fasteners and driving elements having both or at least inner/inside dimension (ID), internal threads or internal tooth's which include but not limits nut, washer, gears, etc. are more difficult to measure by manual tools like gauges, Vernier's, etc., wherein said elements or fasteners plays a vital role to facilitate accurate adjunction of parts or complete structure to perform the intended functioningand in case any measurement error may lead to part unfit for the job or

an erroneous fastener configured in the assembly that may convert into a disastrous failure during service life or at working of the complete assembly or device.

However, the conventional practice of measuring dimensions for said fasteners and driving elements are manually based on gauges or physical measurements that are more prone to manual error which include but not limits error in measuring, a mistake in recording, misinterpretation of data, etc. and it's very difficult to judge the quality of every nut or gears by bear eyes or said gauges. Also, requires more time and manpower to perform said inspection.

Therefore, the technological gap exists which needs to be filled by an automatic device intended to perform said measuring of dimension as well as ensure the quality of threads.

2. Literature Survey

However, loosening problems of threaded fasteners are unavoidable through the bolt tightening method, and many accidents are actually occured and reported. For example, the railroad derailment accident occurred in the UK in 2002 is one of the most famous accident. [1]. the purpose is to obtain self-loosing preventable threaded fasteners by applying spring characteristic effects on bolt structures. Helical-cutting applied bolt structures is introduced through three dimensional (3D) CAD modeling tools. [2]. spring characteristic effect as shown in figure 1 are interested. The purpose is to realize self-loosing preventable threaded fasteners by applying spring characteristics to bolts. [3]. Hydrogen embrittlement of fasteners is a major factor in the choice of material or coating for such components. [4]. Various researches are carried out to meet Industry requirements to reduce fitting problems of fastners by dimension and reducing the accidents was happened by loosing the fastners. In the present study we made a dimension qualification machine to overcome the dimensional problems.

3. Objectives:-

Some of the objects of the present disclosure, which at least one embodiment herein satisfies,are as follows:

1. An object of the present invention is to measure inserted component or part.
2. Another object of the invention is to measure inside, outside dimension, length of insertedcomponent or part.
3. Further object of the invention is to rectify the quality of threads for inserted component or part.
4. Furthermore object of the invention is to count the batch and total number of inserted

components or part.

5. Another object of the invention triggers the alarm to notify the counting of the maximum threshold of components as set by the user.
6. Still another object of the invention is to notify or stop functioning in case of feeding erroneous or undesired measuring components.
7. Another object of the invention is auto-positioning of measuring components to perform the measurement and making a batch of inserted measuring components or part to dispatch the final product.
8. More object of invention easy to perform maintenance and maintaining the existing count status in case of power failure.
9. Another object of the invention is less time and manpower required.

4. BRIEF DESCRIPTION OF THE ACCOMPANYING DRAWING:

A retrofitting module for a vehicle and method of formulation of same in the present invention described with the help of the accompanying drawing, in which:

Figure No. 01

Fig. 1 illustrates a schematic view of the measuring machine

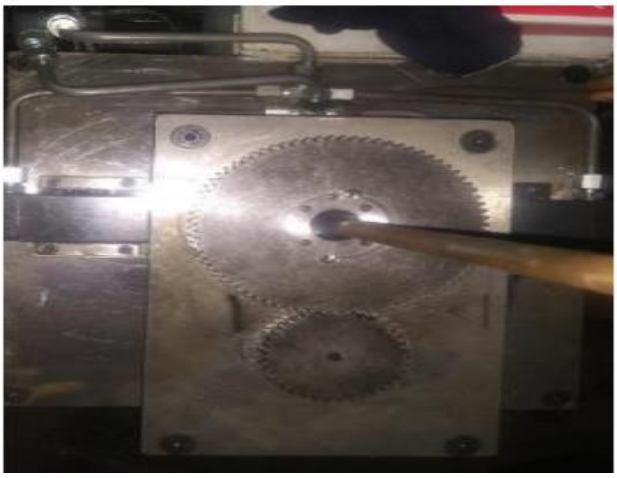

Fig. 2 illustrates a top view of the measuring machine

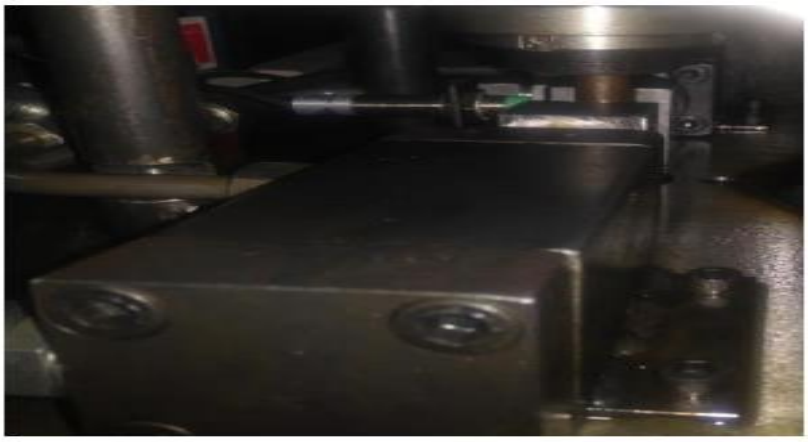

Fig. 3 illustrates a first clamping jaw,

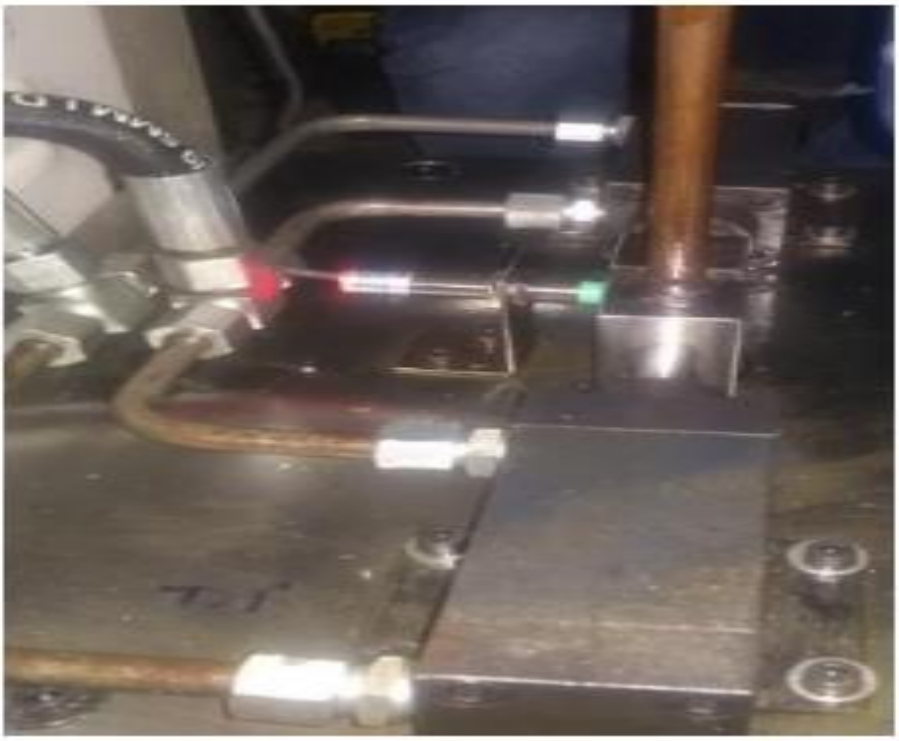

Fig. 4 illustrates a second clamping jaw,

Fig. 5 illustrates a die

5. DETAILED DESCRIPTION:

The present invention envisages a measuring machine comprising; a die, a pair of gearing, an operator, a first clamping jaw, a second clamping jaw, a sensor, a counter configured and a processing unit configured in such a manner that an outside diameter (OD) of a measuring component or part is desired to be precisely passed through a cavity made in die as a go gauge, whereas an inside diameter (ID) of said part configured to engage with the outside diameter (OD) or threads of tool or tool surface and pass through the tool in a manner that the tool comprising guiding relive at the top for easy entry of said part or said measuring component that has to be measured. As said measuring component or part is inserted in an adapting tool that is surrounded by said rotary die having the shape of said measuring component or part thathas to pass from said die for OD measurement, and for ID measurement the dimension or threads of said measuring component or part are engraved on OD of said stationary tool, as the part qualifies the set of measurement standards set for qualification the first clamping jaw opens to allow the part to measures as accepted part and counted by a sensor configured with said first clamping jaw to count as qualified quantity, if not then count as rejected part. Said process of measurement of accepted and rejected parts continue until the specified batch size completes, for example, the batch size set for 10 number of parts as one batch said counter will count 10 numbers of parts in said batch. As said batch completes said second clamping jaw opens and said first clamping jaw close to further forward said batch of accepted parts to accepting tray or user packing device that can be processed further as per user requirement. Wherein said disc rotated by means said pair of gearing driven by said operator which includes but not limit a motor driver etc. Whereas in case said measuring component or part comprising dimension that are not acceptable within the set parameter by the user then said machine configure to holds the processing and triggers the beep to manually remove the part or component as rejected part that can be set aside in rejection tray for rejection analysis. Whereas the complete data of rejection, acceptation, the quantity of batch or a total number of parts counted, reset position to recount, etc., is stored in the processing unit and can be retrieved as per user requirement. Further, said details can be displayed on the dashboard of a control panel for monitoring. Furthermore, the user can modify the details which include but do not limit the batch size, reset count, power off, hold execution, retrieving the total count of the day, no of

batch counted, no of rejection, the performance of machine per hour, quality of products based on rejection or accepting, etc. In another embodiment, wherein said measuring component with the possibility in size variation exists then the configuration with the above embodiment can be modified in a manner that the undersize measuring component for a height and said outside diameter (OD) has to pass through a means which include but not limits a net or sheet with measuring holes or a vibratory bowl, etc. Wherein in the first pass or at the first station said undersize components having the less outside diameter than the desired can be filtered out through said holes of saidnet or sheet or in a vibratory bowl, whereas in the second pass or at the second station said measuring component having a less height than the desired height can be filtered out through said holes of said net or sheet or in a vibratory bowl. Wherein said measuring hole can be designed by considering the minimum desirable dimensions. Further in the case of said measuring component with more or plus outside diameter or the height can be filtered out from said rotating disc set with precise desired outside dimension and the distance between said first and second clamp as per the batch size respectively. However, in case of rejection for more or plus size outside diameter or height said machine will configure to trigger the error beep or mark that to indicate the rejected part that can be removed manually.

In another embodiment, a sensor that includes but does not limit a proximity sensor can be configured with said rotating die and/or said tool and/or said clamping jaws in order to record the exact desired dimension of the measuring part and triggers for the error mark or beep in case of an error in measurement or rejected part with undesirable dimension.

In a further embodiment, a vibrating chamber or vibratory bowl feeder can be configured over the part of measuring component entry point of said measuring machine, wherein a complete lot of randomly collected measuring components or parts can be dumped for measurement and positioned in a manner to automatically fed through the relive part of said measuring tool and further engaged through said measuring tool and said die to undergo the processes of measurement and can be stored in the accepted chamber or taken out as rejected part.

In another embodiment a packing means like a cardboard box, packing wrapper, etc., is

provided at the exit of the accepting tray to automatically pack the accepted batch of product or part to ease of dispatch. Whereas in another configuration a conveyor or belt and drive mechanism is associated with said accepted exit tray to be carried over the collection or packing station wherein said accepted part or component can be packed and dispatched in the required manner.

6. Results and Conclusion

The present disclosure described hereinabove has several technical advantages including, but not limited to, measuring inside and outside dimensions of input parts or component to be measured

wherein:

- The component or part can be inserted from the top relive part of the measuring toolthat leading to easy insertion to the tool without any precise alignment.
- Said fed part further measured for required inside-outside dimension and in case threads if required.
- Further said accepted parts counted as accepted parts and rejected parts can be removed manually.
- The accepted part can be formed in an accepted batch for packing and can be dispatched.
- Automatic monitoring activities include but do not limits the number of accepting, rejection, total part count, reset position, setting batch size, etc.
- Flexible to modify as per user requirement and nature of the part.
- Said machine is simple in operation with less cost.
- Less time and manpower required.

References:

1. Yamamoto A and Kasei S 1977 J. Japan Soc. Prec. Eng. 43(4) 470-5.
2. Izumi S, Yokoyama T, Iwasaki A and Sakai S 2005 Trans. Japan Soc. Mech. Eng. Series(A), 71(702) 204-12.
3. Kamiya S, Izumi S, Sakai S and Yamada Y 2012 Trans. Japan Soc.Mech. Eng. Series(A), 78(795)
4. Machinery's Handbook by ERIK OBERG, FRANKLIN D. JONES, HOLBROOK L. HORTON, and HENRY H. RYFFEL, Published by Industrial Press Inc., New York, NY
5. Introduction to the Design and Behavior of Bolted Joints, Non-Gasketed Joints by John H. Bickford, Published by CRC Press (www.crcpress.com), Taylor & Francis Group
6. Ravinder Kumar & Deepak Gaur, "Overview of Hydrogen Embrittlement in Fasteners", International Journal of Research in Engineering & Technology, Vol. 2, Issue 4, Apr 2014, 239-244
7. Sethuraman R, Kumar S. A. "Finite Element Based Member Stiffness Evaluation of Ax Symmetric Bolted Joints" Journal of Mechanical Design by ASME, Vol. 131, p. 1-11, Jan 2009.
8. Pai N.G, Hess D.P. "Three-dimensional finite element analysis of threaded fastener loosening due to dynamic shear load" Journal of Engineering Failure Analysis. Vol 9, p 383–402. 2002.
9. ASM Handbook Volume 11: Failure Analysis and Prevention, ASM International, p 708, 811, 2002
10. Salim Brahimi (2014), Fundamentals of Hydrogen Embrittlement in Steel Fasteners, IBECA Technologies Corp, July 2014.