Development of a Multi-function Taper-plate Tooth Spanner

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Abstract: This paper introduces a new tool for processing internal and external threads, multifunctional taper plate teeth wrench. The wrench has the functions of hinges, plate teeth rack and screwdriver. It combines the hinges and plate teeth rack together, and converts the handle into a set of switchable screwdriver heads. They share a handle and a main body with only one volume. The size of a plate rack. Compared with the existing hinges and plate toothholders, the utility model has the advantages of simple structure, low manufacturing cost, space saving, convenient carrying and high operating efficiency.

1. Introduction

At present, small-sized thread processing tools mainly include taps and plate teeth, taps are used to process small-sized internal threads, plate teeth are used to process small-sized external threads, the auxiliary tool used to clamp the taps for internal thread processing is the tap wrench, also known as "hinges", and the auxiliary tool used for clamping plate teeth for external bolt processing is the plate tooth wrench, also known as "plate teeth rack", and tap wrench and plate teeth wrench are always independent of each other. That is to say, when it is necessary to carry both tap and plate teeth for thread processing, it is also necessary to carry both taper wrench and plate teeth wrench, which increases the carrying capacity of auxiliary tools in invisible. For tool manufacturing enterprises, it will inevitably increase the manufacturing cost of auxiliary tools.

In addition, when the small-sized threaded holes on the workpiece are processed well, they usually need to be tightened with the bolts. At this time, it is inevitable to lack the screwdriver as an auxiliary tool. That is to say, while carrying the tap wrench and the plate-tooth wrench, it is also necessary to carry the screwdriver, leading to the carrying capacity of the auxiliary tool to enter again. One step increase will not only occupy limited storage space, but also reduce the weight of a large number of auxiliary tools.

This paper introduces a multi-functional taper plate teeth wrench, which can not only clamp different specifications of plate teeth, but also different specifications of taps. At the same time, the handle can also be used as different types of screwdrivers.

2. Integral Design of Multi-function Taper-plate Tooth Spanner.

In view of the existing technical problems, the multi-functional tap plate tooth wrench integrates the full functions of tap wrench, plate tooth wrench and screwdriver for the first time, and when used as tap wrench, it can also be extended to reamer wrench for use, while meeting the clamping and interchange of different specifications of taps, reamers and plate teeth; Carry a set of wrenches to meet three working requirements. In order to achieve the above purpose, the following technical scheme is designed.

Fig. 1 is the main view of a multifunctional tap plate tooth wrench of the present invention. Fig. 2 is a side view of a multifunctional tap plate tooth wrench of the invention.

In the picture, 1. Tool Clamping Ontology, 2. Fixed handle, 3. Movable handle, 4. Plate teeth clamping...

3.1 The steps used for clamping taps to process internal threads are as follows.

Step 1: Select a tap for processing, insert the end handle of the tap into the tap clamping hole, rotate the movable handle, and press the end handle of the tap into the tap clamping hole through the tap clamping block.

Step 2: Hold the fixed handle and the movable handle with both hands, place the top of the tap on the hole of the screw to be processed, apply downward pressure and rotate the tool to clamp the body until the processing of the internal thread is completed.

Step 3: Put the tap out of the processed screw hole, rotate the moving handle in reverse, relieve the pressure of the tap clamping block on the end of the tap handle, and pull the end of the tap handle out of the tap clamping hole. Similarly, this operation is also suitable for holding reamers of different specifications for reaming.

3.2 The steps for processing the external thread of the clamping plate teeth are as follows.

Step 1: Select a processing plate teeth, according to the different types of plate teeth, select the matching plate teeth transfer sleeve, put the plate teeth through the plate teeth transfer sleeve into the plate teeth clamping hole, tighten the plate teeth fastening screw, complete the plate teeth fixed in the plate teeth clamping hole.

Step 2: By rotating the movable handle, the tap clamping block is retreated to the limit position to ensure that the size of the tap clamping hole is the largest and the threading passage is allowed for the screw to be processed.

Step 3: Hold the fixed handle and the movable handle with both hands, place the top of the inner hole of the plate teeth at the end of the screw to be processed, apply downward pressure and turn the tool to clamp the body until the processing of the outer thread is completed.

Step 4: Put the plate teeth out of the processed screw, loosen the plate teeth fastening screw, remove the plate teeth fixed, and remove the plate teeth and the plate teeth switching sleeve from the tap clamping hole together.

3.3 The steps for screw screwing as a screwdriver are as follows.

Step 1: Remove the plug cap on the movable handle, select the matching screwdriver head according to the screw nut type, and insert the selected screwdriver head into the positioning hole of
the screwdriver head at the end of the fixed handle, and fix it by magnetic force.

Step 2: Hold the tool to clamp the body or fix the handle, place the screwdriver head on the nut of the screw, and apply the rotating force until the screw is screwed.

Step 3: Pull the screwdriver head out of the positioning hole of the insertion of the screwdriver head and put it back into the center hole of the movable handle. Then the plug head is sealed back. The screwdriver head is re-encapsulated back into the movable handle.


The tool designs a pair of handles and a main body for the hinges, plate teeth racks and screwdrivers. The volume of the tool is only the size of a plate teeth rack. It integrates all functions of the tap wrench, plate teeth wrench and screwdriver for the first time. When used as a tap wrench, it can also be extended to use as a reamer wrench. It meets the clamping and interchange of different specifications of taps, reamers and plate teeth, and only needs to carry a set of wrenches to meet the four working requirements.

5. Conclusion

In this paper, the research and practice of hinges, plate teeth spanners and screwdrivers are carried out in many aspects, and a new type of multi-functional taper plate teeth spanner is designed. In practical application, only one set of wrenches is needed to meet the four working requirements, which greatly reduces the carrying capacity of auxiliary tools, effectively saves the storage space of tools, and reduces the weight of auxiliary tools and improves the portability. Meanwhile, for tool manufacturing enterprises, the cost of dies and dies is reduced. About materials, reduce manufacturing costs.

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