Design, Development and Manufacturing of an Attachment Unit for Horizontal Boring and Milling Machine

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ABSTRACT

Many manufacturing sectors, especially medium scale and small scale industries are facing an incredible problem for machining keyway and certain milling operations, on job face which is horizontal to spindle axis of horizontal boring and milling machine whose approximate machine cost is 1 to 1.25 crores. There are a few alternatives for this options but they are highly time consuming and monetary issues is the major concern. For example to perform such a keyway machining, it is mandatory to purchase Plano milling or Planer milling which cost 60 to 70 lakh. Hence there is need of designing and developing a milling attachment which shall fulfill the needs machining keyway and certain milling operations on horizontal Boring and Milling machine on same job setting. Manufacturing such an attachment, shall benefit in reduction in labour cost, cycle time reduction machining process, without changing position of job, majorly save financial capital to purchase different machine tools attachments.

Keywords— attachments, keyway, side milling, cycle time

I. INTRODUCTION

The present invention relates to all types of Combined boring, drilling and milling machines, including so-called horizontal boring machines, jig mills, jig borers, etc., and, more particularly, to the mechanism for controlling the movements of the various machine tool elements thereof. The principal object of the invention is the provision of a novel and improved, combined boring, drilling and milling machine, including a single control member mounted for universal movement and capable of controlling the relative movement between two of the machine tool elements movable at right angles relative to each other in such a manner that the machine tool elements move relative to each other in the direction or approximate direction that the control member is moved. [5]

In modern engineering construction such as hydraulic turbines, steam turbines, cylinder blocks, diesel-engine cradles, ship-building parts, alternators, and so on, it is frequently advisable, in order to reduce the machining time to a minimum and to obtain greater accuracy, to minimize the handling of these parts and to carry out all the machining operations in one setting of the work piece. This is particularly important in the case of very heavy parts composed of several elements which are difficult to adjust and to clamp on the machine tool, for there is a risk of distortion at each new setting. When using conventional horizontal milling and boring machines it is at present possible to perform various Machining operations such as boring, drilling, counter- ’Boring, tapping, milling, and so on, without moving the
Work piece from one machine to another. However, ‘when the operations include turning and boring mill operations, it is necessary to move the work piece from the horizontal boring and milling machine to a vertical turning and boring mill where a new setting is required.’

This invention relates generally to machine tools and more particularly to a rotary head milling attachment particularly adapted to be used in conjunction with milling machines for performing intricate milling operations. The principal object of this invention is to provide an improved rotary head milling attachment having a vertically depending rotatable tools spindle carried for bodily gyratory and radial movement. Another object of the invention is to provide improved mounting and driving means for a milling attachment having a tool spindle carried for bodily gyratory movement. Another object of the invention is to provide improved power transmitting means for driving the bodily movable rotatable tool spindle of a machine tool. A further object of the invention is to provide improved simplified indexing apparatus for the orbit ally and radically movable spindle type that is adapted to be removable mounted on and driven by a milling machine. Another object of the invention is to provide improved mounting and driving means for a milling attachment having a tool spindle carried for bodily gyratory movement. Another object of the invention is to provide improved power transmitting means for driving the bodily movable rotatable tool spindle of a machine tool. Another object of the invention is to provide improved mounting and driving means for a milling attachment having a tool spindle carried for bodily gyratory movement. Another object of the invention is to provide improved power transmitting means for driving the bodily movable rotatable tool spindle of a machine tool. Another object of the invention is to provide improved power transmitting means for driving the bodily movable rotatable tool spindle of a machine tool.

A further object of the invention is to provide an improved indexable indexing apparatus for the orbit ally and radically movable spindle type that is adapted to be removable mounted on and driven by a milling machine. Another object of the invention is to provide improved power transmitting means for driving the bodily movable rotatable tool spindle of a machine tool. Another object of the invention is to provide improved indexable indexing apparatus for the orbit ally and radically movable spindle type that is adapted to be removable mounted on and driven by a milling machine. Another object of the invention is to provide improved power transmitting means for driving the bodily movable rotatable tool spindle of a machine tool. Another object of the invention is to provide improved indexable indexing apparatus for the orbit ally and radically movable spindle type that is adapted to be removable mounted on and driven by a milling machine.

According to this invention a removable milling attachment for a machine tool is provided with a tool spindle that is carried for bodily gyratory about a selected radius and for angular adjustment about a pivot axis transverse to the axis of rotation. To this end, the tool spindle is journal led in a carrier that is pivotally mounted within a cross slide movably carried for radial adjustment by a main rotary member journal led to rotate in a frame that is removable secured to a machine by means of an attachment bracket. By means of this arrangement, the attachment spindle can be positioned to rotate about an axis concentric with the axis of rotation of the main member, or can be angularly adjusted relative to its axis of rotation. Likewise, by radially adjusting the cross slide relative to the main rotary member, the latter ‘is rotatable to effect bodily gyration of the tool spindle about the selected radius. A hand wheel journal led in the frame is connected to rotate the main member throughout a full 360°, or for any required lesser amount as determined by a selectively adjustable positive stop mechanism [8]

2 Problem statement
Manufacturing such an attachment, which will reduce labour cost and assist to perform rapid machining, without changing position of job and avoid wastage of money required to purchase different machine tools for machine mentioned in following figures.

II. CONCLUSION
With help of this attachment we can do Keyway on top and side face of JOB with 5 micron accuracy without changing setting of job. Achievement of tremendous improvement in terms of accuracy in side milling and top milling operation of heavy jobs like Gear Box casing as shown in fig 2. Enormous minimization in labour cost by avoiding extra machine operator. Saved an extra machine purchase cost. Considerable reduction in floor space. Minimization of time in machining the job.

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REFERENCES


Fig 3