

PUBLISHED
MAY 4, 1943.
BY A. P. C.

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TOOL MOUNTINGS
Filed March 26, 1942

Serial No.
436,340

FIG. 1

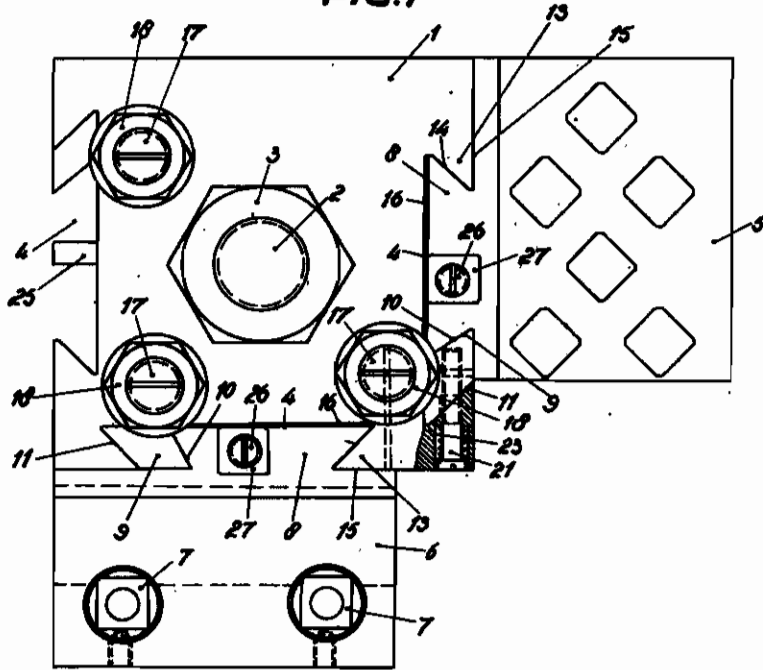
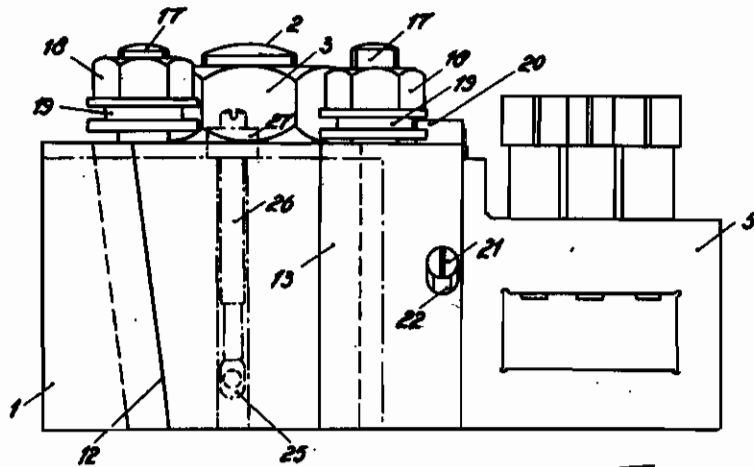


FIG. 2



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TOOL POSTS FOR ACCOMMODATION OF LOOSE TOOL HOLDERS

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Application filed March 26, 1942

The invention relates to a tool post, particularly a turning tool or drill holder post for a lathe saddle for the accommodation of loose tool holders in which tools can be adjusted and fastened, such tool holder being adapted to fit by means of a dove tail onto the post, whereas clamping means are provided by means of which the tool holder can be connected firmly to the post in a predetermined position which, if desired, may be fixed by means of abutments.

It is an object of the invention to improve tool posts of the kind referred to in order to make them suitable for being used in the manufacture of high precision work, in which e.g. tolerances of the order of half of a thousandth of an inch are admitted.

A further object of the invention is in the provision of a tool post of strong and simple construction, insensitive against vibrations and handling of which is easy and requires no special skill.

Another object of the invention is to provide for a tool post which is very efficient in use by that it enables a very quick exchange of a tool e.g. on a turning lathe by another tool and later on the replacement of the first mentioned tool so as to be absolutely sure that the said first mentioned tool then will occupy exactly the same position as before, no further adjustment of the tool being necessary thereafter. Due to this a high percentage of the time the lathe or other machine is running will be actually used for working purposes, and no considerable part of this time will be lost for exchange and adjustment of tools. The output of an ordinary turning lathe can be made substantially as high as of a turret lathe, which is especially of importance for mass production. High precision nevertheless is guaranteed also in this event.

A tool post in which tool holders are fastened by means of a dove tail connection is known (see German Patent Specification No. 559,290). It is constituted by a block which in plan view substantially has the form of a square and in which vertical slots are provided extending according to the vertical side edges of the block. The slots are arranged in pairs diametrically opposing one another, so that the depth extension of each slot is directed to the vertical axis of the block. In this manner the vertical side faces of the blocks become the male parts of a dove tail.

To this block belong loose tool holders such as turning tool holders and drill holders. They are made in the form of female parts of the dove tail

and they may be pushed easily and quickly onto the block, sliding in a vertical direction. In the slots of the block horizontal pins are mounted which are capable of being moved outwardly together so as to push the ribs of a tool holder located in succeeding slots of the block outwardly too, so that the dove tail members become clamped and the tool holder is fastened immovably on the block.

When using such tool post the tools are adjusted only once for a certain kind of work. Thereafter they may be removed together with the tool holder from the tool post and replaced later on very easily and quickly, whereas one can be sure that in this event they will take exactly the same position as before. An ordinary lathe thus becomes nearly as suitable for mass production as a turret lathe.

In this known tool post arrangement the surfaces of the post and of the holder which are to be clamped exactly one upon the other and which therefore act as coordinate system surfaces for the tool are constituted by the so-called inclined faces of the dove tail which do not adjoin one another qua dove tail profile, but are separated from each other by another surface of the dove tail profile. Clamping occurs under the influence of the movement of a pin, as stated before, and although this movement is controlled or initiated by a single mechanism slight irregularities will soon occur. The holder will be fastened then to the block in a somewhat twisted position, due to the fact that one of the ribs, i.e. one of the sides of the female part of the dove tail is pushed outwards a little further than the other one and this makes it impossible to use the said tool post for work of high precision.

The invention aims at an improvement in this respect, which is obtained in that the dove tail together with the clamping means are so designed that the surfaces of the tool post and of the tool holder which are to be clamped exactly one upon the other and thus to act as coordinate system surfaces for the tool, on each of the contacting members are constituted by two surfaces including an angle and adjoining one another qua dove tail profile. One real angle of the dove tail profile thus is used for the coordinate system and only one clamping pressure needs to act in one direction and therefore the relative position of the block and the holder are determined univoecally.

The invention furthermore enables to have the female part of the dove tail constituted by the post (the block) and the male part by the tool

holder. Due to this all vertical side faces of the block may be used if necessary at the same time for fastening tool holders. In this manner a piece of work may be simultaneously turned off e.g. on the exterior and drilled in the interior. The known construction did not permit this.

In the drawing an embodiment of the invention is illustrated.

Fig. 1 is a plan view of a tool post according to the invention adapted for being mounted on a lathe saddle.

Fig. 2 is an elevation of this tool post, the foremost tool holder illustrated in Fig. 1 being taken away for clearness.

The tool post proper consists of a square block of steel 1 mounted on the upper slide of a lathe saddle by means of a bolt 2 and a nut 3. For special cases the block of course could get another than an exactly square shape in plan, e.g. a triangular or polygonal shape.

In the illustrated embodiment three of the side faces of the block comprise dove tail slots extending in a vertical direction; they are indicated by the numeral 4.

The tool holders proper may be slid into these dove tail slots and fastened therein. As examples of tool holders there may be mentioned here single turning tool holder, multiple tool holder, drill holder, boring bar holder, etc.

In the drawing a multiple tool holder 5 comprising set screws for three tools arranged one adjacent the other and a boring bar holder 6 is illustrated. In the boring bar holder acting as a clamping element the boring bar may be fastened by means of the screws 7.

Each of the tool holders is provided with a dove tail ridge 8 acting as the male part of the said dove tail. In the slots 4 wedge-shaped gibs 9 are arranged, one side face 10 of which extends exactly vertically, constituting one side of the female part of the dove tail. The other side face 11 extends in an inclined direction as is shown in Fig. 2 in which the contact surface 12 for the gib 9 in the block 1 has been shown. If the male part 8 of the dove tail forming part of the tool holder is pushed into the slot 4 and if thereupon the gib 9 is inserted from the upper side and pressed down, the tool holder will be fastened immovably in the block 1. The clamping pressure fully acts to that side of the dove tail which is not formed by the gib and this means that the tool holder is forced onto the edge 13. Of this edge the side faces 14 and 15 are ground and these faces act as coordinate system surfaces. Each time clamping occurs here the tool holder will be in exactly the same position. This position of the tool holder is always univocally determined.

It will be understood, that not only the faces 14 and 15 are able to act as coordinate system surfaces, but that also e.g. the faces 14 and 16 could act together for this purpose. The fundamental idea is, that if an edge-shaped or angular piece is forced into an angular cavity, which both are made to fit exactly one into the

other, a univocally predetermined position can be repeated at will with a highest degree of precision.

Furthermore it will be clear that e.g. the tip of the edge ridge 13 could be cut away. The clamping action then remains as well. In this case the faces 14 and 15 do not adjoin one to the other directly any longer, but qua dove tail profile they are and remain adjacent or succeeding i. e. adjoining surfaces.

The inclination of the face 10 taken with respect to the basic plane of the dove tail slot differs from that of the face 12. This is desirable in order to prevent the gib 9 from rotation about a vertical axis and being inclined to turn out of the dove tail slot when being driven downwards.

Actuation of the gib 9 can be obtained in different ways. In the device illustrated three stud bolts 17 are fastened in the block 1 which are provided with nuts 18. These nuts 18 are provided with collars so as to form grooves 19. Projections 20 of the gibs 9 engage these grooves 19 and thus when the nuts 18 are screwed upwards or downwards the gibs 9 will move upwards or downwards with them too.

If a gib 9 is released by screwing the nut 18 upwards the tool holder which has been tightened by this gib can be taken out without any difficulty, but in this event the gib 9 itself also would fall out of the dove tail slot if no special measures were taken to prevent this. To this end the gibs 9 are fastened in the dove tail slots, in such a manner, however, that up and down movements to a restricted extent are permitted. To this end studs 21 are screwed into the gibs 9 passing through an elongated aperture or slot 22 in the block. The studs 21 are surrounded by a spring 23 and due to the latter the gib 9 is always pulled against the face 12 of the block 1 but nevertheless the studs 21 are permitted to move up and down within the slot 22.

In each dove tail slot 4 an abutment 25 is provided. A screw 26 is mounted on each tool holder so as to permit the bottom end face of this screw to come into contact with the abutment 25. By means of a screw driver the screw 26 can be rotated and adjusted in a predetermined position and thereupon the tool holder is only permitted to be pushed into the dove tail slots always to the same extent or depth, i. e. until the screw 26 touches the abutment 25.

The screw 26 may be secured by means of a lock nut 27.

In Fig. 2 the screw 28 and the abutment 25 are shown by means of dash and dotted lines because they are located before the drawing plan.

The arrangement as illustrated in Fig. 1 enables simultaneously working a work piece on the exterior even by means of three turning tools and in the interior by means of a drill. At the same time a third slot 4 is left free so that if necessary also in this a tool holder could be accommodated.

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