No. 628,756. Patented July 11, 1899.

F. H. CATHCART.

TOOL HOLDER.

(Application filed Apr. 5, 1897.)

(No Model.) 2 Sheets—Sheet 1.

Fig. I.

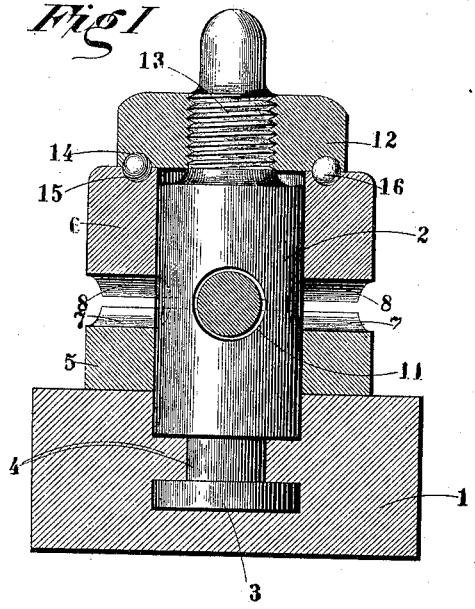


Fig. II.

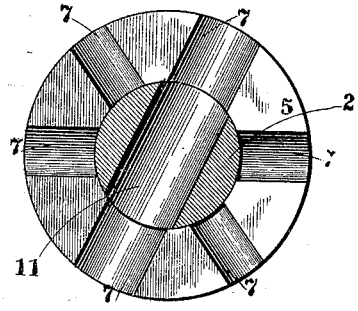


Fig. III.

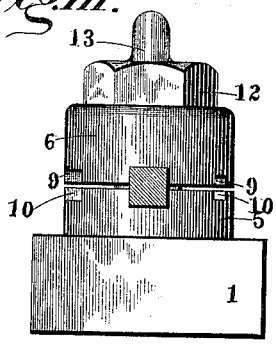
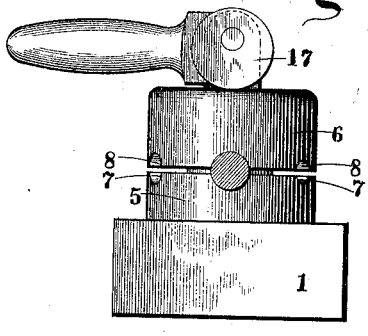


Fig. IV.



Witnesses

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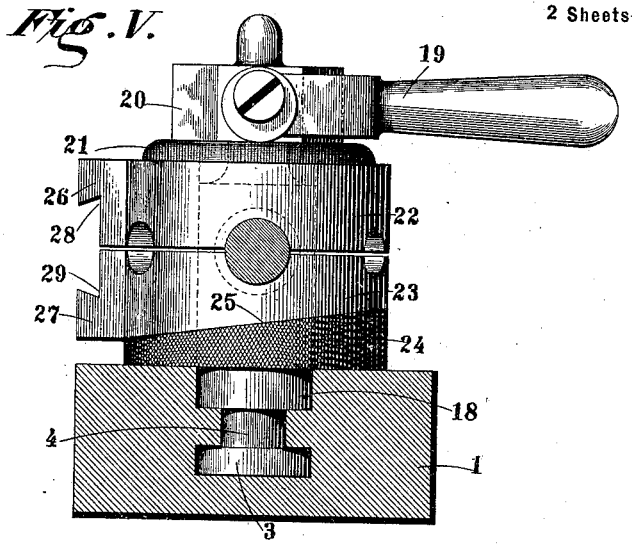
(No Model.) 2 Sheets—Sheet 2.

Fig. V.



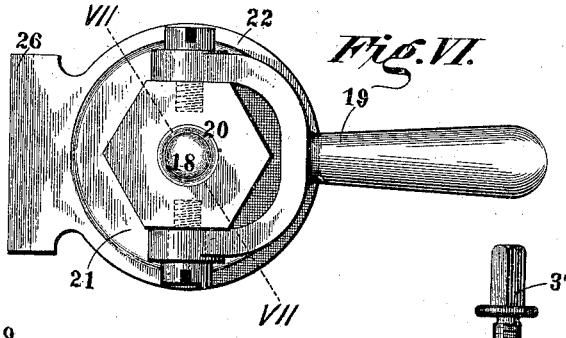


Fig. VI.

Fig. VII

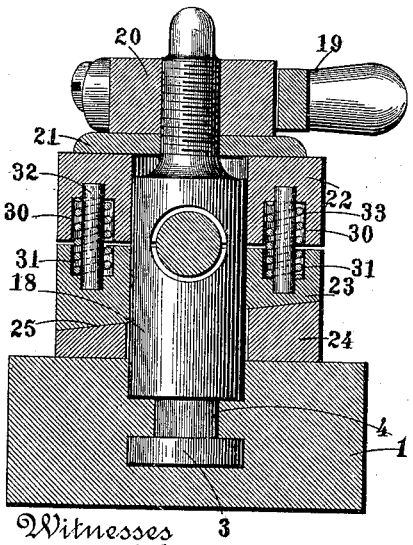
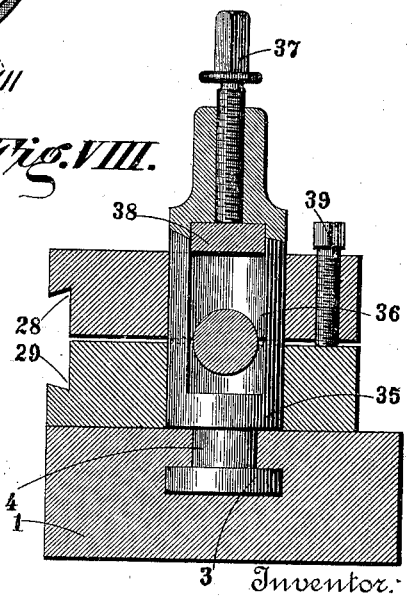


Fig. VIII.



Witnesses

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UNITED STATES PATENT OFFICE.

FRANK H. CATHCART, OF ALEXANDRIA, VIRGINIA, ASSIGNOR TO THE EMPIRE ENGINE AND MOTOR COMPANY, OF NEW YORK, N. Y.

TOOL-HOLDER.

SPECIFICATION forming part of Letters Patent No. 628,756, dated July 11, 1899.

Application filed April 5, 1897. Serial No. 630,849. (No model.)

To all whom it may concern:

Be it known that I, FRANK H. CATHCART, of Alexandria, in the county of Alexandria, State of Virginia, have invented certain new and useful Improvements in Tool-Holders, of which the following is a complete specification, reference being had to the accompanying drawings.

The object of my invention is to produce improvements in tool-holders especially designed for use on lathes or similar machines, which are adapted to be adjustable to tools having shanks of different sizes and to hold each one of them with rigidity when inserted in any of the positions in which it may be operated or at any angle at which it may be presented to work within the lathe.

In the accompanying drawings, Figure I is a central vertical section of the collars and nut of one form of my holder, showing the post in elevation. Fig. II is a transverse section through the post, taken just above the lower collar. Fig. III is a side elevation of my holder, showing rectangular apertures for holding a tool-shank. Fig. IV is a side elevation of my holder, with a cam working in the top of the post and adapted to compress the collars. Fig. V is a side elevation of a modified form of my holder in which an adjustment-washer is employed, together with tool-engaging side recesses or jaws. Fig. VI is a top plan view of the same. Fig. VII is an oblique section on the line VII VII of Fig. VI, showing retaining-pins and separating-springs. Fig. VIII illustrates my tool-holding collars adapted to be used in connection with the ordinary tool-post now in common use.

Referring to the figures on the drawings, 1 represents in section the slide-rest of lathe, which is illustrated by way of example as one of the numerous uses to which my holder is applicable.

2 represents a post which may be adapted to be secured to the slide-rest by any of the ordinary means—as, for example, a disk-head 3, formed, as by turning, upon the lower end of the neck 4.

5 indicates the lower one of a pair of collars that in use is adapted to press against the top of the slide-rest 1 and is surmounted by an upper collar 6. Each of the collars is preferably provided with a series of radially-disposed recesses which are of graduated sizes, respectively, to fit tool-shanks of different sizes. The radial recesses in the collar 5 are numbered 7 in the drawings. Those in the upper collar are numbered 8.

In Fig. II the top plan view of the lower collar shows the recesses 7 as arranged in the upper face of the collar. In that figure the recesses are illustrated as of semicylindrical shape in cross-section; but their shape depends entirely upon the character of the tool to be held. In Fig. III, for example, the recesses 9 and 10 in the upper and lower collars, respectively, are illustrated as rectangularly shaped.

The recesses 7 and 8 or 9 and 10, or whatever their shape may be, are adapted to register one with the other and to constitute means for holding the shank of a tool firmly between them. To accommodate them to the proper performance of their office, I provide through the post 2 a diametrical aperture 11 of any desired shape and of a size greater than the size of the largest shank which the collars 5 and 6 are adapted to receive. One post may be adapted to accommodate more than one set of collars, in which case the aperture 11 should be larger than the size of the largest shank any of the sets of collars may accommodate.

The purpose of the employment of the diametrical aperture 11 is to admit the free passage through the post of a tool-shank, so that without any immediate connection with the post whatever it may be held securely by the diametrically opposite recesses in the opposing face of the respective collars. By this means a broad support for any tool-shank of suitable size is afforded, in which the shank is firmly held to resist any force which may be brought to bear against it whether the force be applied tangentially to the longitudinal axis of the tool, tending to impart a rotary movement of the tool upon its axis, or tangentially to the axis of the post, tending to turn the tool around the axis of the post, or whether applied vertically or horizontally, or whether applied endwise in a manner tending to impart end thrust to the tool.

In connection with the members already described it is necessary to employ suitable

means for compressing the collars one toward the other and preferably at the same time the lower collar against the face of its support, since by employment of the latter means one member may be utilized to perform two functions. I prefer to employ for the purpose a nut 12, which works upon the screw-threaded reduced end 13 of the post.

In order to relieve the friction of the nut upon the upper collar, an annular groove 14 may be formed in the lower face of the nut, a corresponding groove 15 may be formed in the opposing face of the upper collar, and between the nut and collar, within the respective grooves, may be provided antifriction-rollers, as of hardened-steel balls 16.

The groove 14 in the nut 12, for example, may be sufficiently deep to retain the balls 16 in place within it, so that they will not drop out of the grooves when the nut is removed from the post; but this is a mechanical detail.

I do not desire to limit myself to the employment of a nut, but may employ other suitable mechanism—as, for example, a cam 17, shown in Fig. IV as pivoted to the head of the post.

In Figs. V, VI, and VII of the drawings I illustrate three modifications, consisting, respectively, of an adjustment-washer, tool-engaging side recesses, and a pin-and-spring connection between the collars. In these figures 18 indicates a post carried, for example, in the slide-rest of the lathe and, as illustrated, adapted to be operated by a cam-lever 19, pivoted, as indicated, to a nut 20, screwing upon the end of the post. Such means of operation, however, are not more essential to this form of post than they are to those previously described, but are illustrated only by way of example. 21 indicates a suitable washer that surmounts the upper collar 22. 23 indicates a lower collar, and 24 an adjustment-washer. The opposing faces of the lower collar of the adjustment-washer, as indicated at 25, are correspondingly beveled or inclined. The exterior surface of the washer 24 is knurled or roughened, so that it may be turned with facility. By turning the washer the beveled faces 25 upon the collar 23 and the washer 24, respectively, serve to elevate the collars 22 and 23, and with them a tool carried between them, in the manner already described.

For certain kinds of work I prefer to provide upon the collars corresponding to the collars 22 and 23 lateral projections 26 and 27, respectively, within which, preferably, are formed opposing recesses 28 and 29, respectively. The side recesses 28 and 29 constitute tool-engaging jaws that are adapted to rigidly hold certain important tools—such as cutting-off, parting, square-nose, or threading tools—in proper position and to facilitate the execution of work that requires the tool-holder to closely approach an obstruction.

In the modified form illustrated in the figures above referred to, as clearly illustrated in Fig. VII, I show, opening through the opposing faces of the collars 22 and 23, recesses 30 and 31, within which work a retaining-pin 32 and a coiled spring 33. Two or more sets of recesses, with their respective pins and springs, are preferably employed with each set of collars. The pins and springs may be employed separately; but I prefer to use them in connection one with the other, the object of the springs being to sustain the weight of the upper collar when released from the pressure of the lever or nut which surrounds it and to afford facility of withdrawing one tool and inserting another.

The object of the retaining-pins is to keep the collars in their proper positions when they are being turned from one position to another upon the post and constitute, therefore, collar-alining mechanism. For that reason the pins extend into shallow pockets provided for them upon the ends of the recesses 30 and 31, respectively, in order that they may continue to perform their office while the springs 33 are operative in separating the collars.

In Fig. VIII, I illustrate the manner in which the ordinary tool-post in common use may be adapted to be used in connection with my clamping-collars. In that figure 35 indicates the ordinary tool-post, 36 its tool-slot, and 37 the abutment-screw, adapted to secure a tool within the slot. Such a tool as illustrated is adapted to be used in connection with collars having a central bore of suitable size by the insertion through the upper part of the slot 36 of a bearing-plate 38, against which the abutment-screw 37 may be turned to compress the collars. The slot 36 in this adaptation of the ordinary tool-post takes the place of the above-described diametrical aperture 11, which I employ in a specially-constructed tool-post.

In Fig. VIII, I show tool-engaging jaws or recesses 28 and 29, as above described, and in connection with them, in the diametrically opposite side of the upper collar, an abutment-screw 39, which, working against the face of the lower collar, is adapted to impart positive pressure against the sides of a tool secured between the jaws 28 and 29.

What I claim is—

In a tool-holder, the combination of a post having a diametrical aperture through it, collars surrounding the post and free to be turned around the same, and having their opposing faces provided with radially-disposed recesses, the aperture through the post being of a size larger than the aperture formed by bringing opposite to each other any two of the recesses in the faces of the collars, and means for compressing the collars against each other, substantially as set forth.

In testimony of all which I have hereunto subscribed my name.

FRANK H. CATHCART.

Witnesses:
J. DU PRATT WHITE,
JOHN M. HITE.