

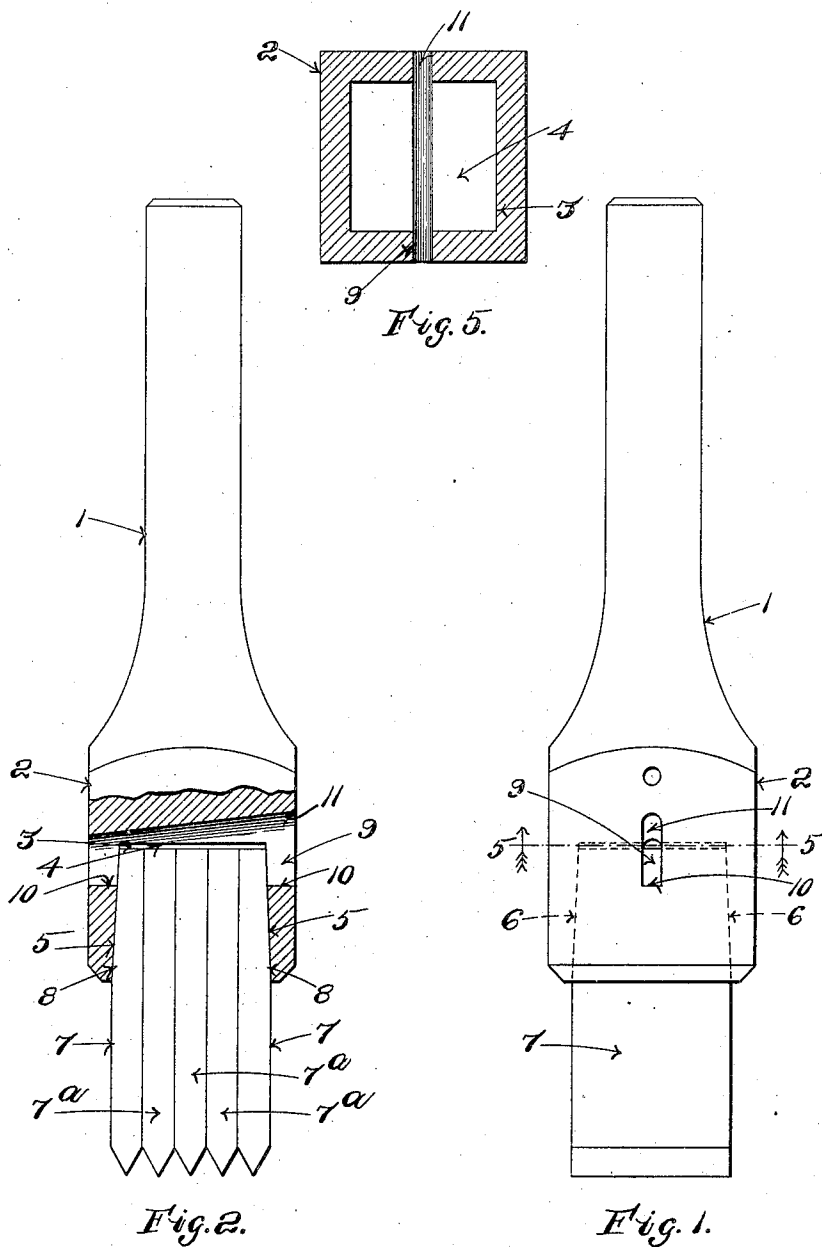
No. 843,931.

PATENTED FEB. 12, 1907.

E. S. COSTA.  
SELF TIGHTENING TOOL HOLDER AND TOOL.

APPLICATION FILED JULY 11, 1906.

2 SHEETS—SHEET 1.



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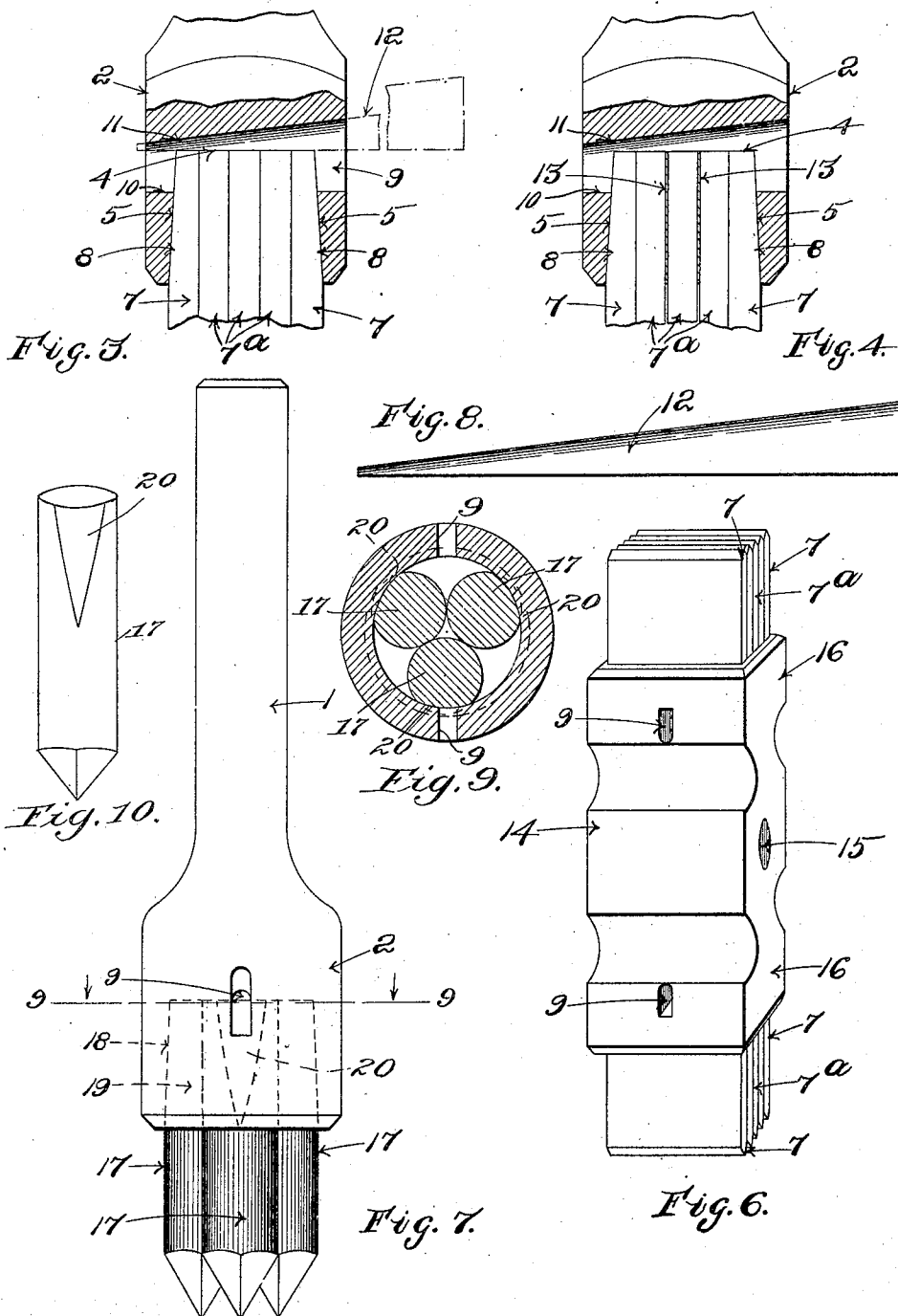
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# UNITED STATES PATENT OFFICE.

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## SELF-TIGHTENING TOOL-HOLDER AND TOOL.

No. 843,931.

Specification of Letters Patent.

Patented Feb. 12, 1907.

Application filed July 11, 1906. Serial No. 325,665.

*To all whom it may concern:*

Be it known that I, ENOS S. COSTA, citizen of the United States, residing at Quincy, in the county of Norfolk and State of Massachusetts, have invented a certain new and useful Improvement in Self-Tightening Tool-Holders and Tools, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention is especially intended for application to tools in which two or more are held in one holder, and especially to tools which are used in work on granite, marble, or iron work, or the like, whether they are power-driven tools or hand-tools—for instance, surfacer bush-chisels and surfacer-points, which are usually power-driven, or hand bush-hammers.

In tools of this class sometimes the cuts or tools have been secured between jaws by bolts which pass through the jaws and the shanks of the cuts which are clamped between the jaws; but in such case the holder is not self-tightening, and it is open to other objections.

One object of the present invention is to provide a construction whereby the self-tightening will be continued to a limited degree sufficient for all practical purposes, and yet so limited that it will not be unnecessarily tight.

Another object of the invention is to make the holder of one solid piece without the use of bolts or clamping-rings.

Another object of the invention is to construct the holder and work-tools in such manner that if the working tools are in the first instance properly adjusted, with the outer ends all on the same level, as the tools are gradually self-tightened they will all move back together, keeping the outer ends all level with each other, as at first.

Another object of the invention is to construct the device in such manner that there will be a self-tightening from both ends—that is to say, until the cuts or tools are forced back to their full limit the self-tightening will occur both as a result of the blow of the hammer on the end of the shank of the tool-holder when it is used as a power-driven tool and also on the rebound after the tools strike the stone.

Another object of the invention is to construct the holder with a slot in such manner that a tapering key may be used to engage the rear ends of the tools, by means of which

the tools can readily be released when it is desired to do so.

The invention will be fully understood from the following description, taken in connection with the accompanying drawings, and the novel features are pointed out and clearly defined in the claims at the close of the specification.

In the drawings, Figure 1 is a front elevation of a tool-holder, such as used in connection with surfacer bush-chisels driven by power and having the chisels inserted ready for use, being set back far enough to hold readily at the beginning of the operation, and showing a space between the inner or rear end of the chisels and the end of the socket for the self-tightening of the tool after it begins to be operated. Fig. 2 is a side elevation at right angles with Fig. 1 with the socket partly in section. Fig. 3 is a side elevation similar to Fig. 2, broken away and partly in section, showing the position of the cuts or chisels after they have been forced back their full limit in the socket and showing in dotted lines the key inserted for use in releasing the chisels. Fig. 4 is a view showing the use of shims between some of the tools which may be used, if necessary, to take up looseness. Fig. 5 is a cross-section on line 5 5 of the holder of Fig. 1 looking upward and the tools being removed. Fig. 6 is a perspective view of a hand bush-hammer embodying the invention. Fig. 7 is an elevation of a tool adapted for use with cylindrical tools for pointing. Fig. 8 is a detail of the loosening-key. Fig. 9 is a cross-section on line 9 9 of Fig. 7. Fig. 10 is a detail view of one of the surfacer-points shown in Fig. 7.

Referring to the drawings, 1 represents the stock or shank of a surfacer bush-chisel and 2 the socket-head formed with a square socket or recess 3 in the end to receive the cuts or chisels, the inner end 4 of the recess 3 forming a stop which limits the inward movement of the rear ends of the chisels when forced in to their full extent. The inner faces 5 5 on two opposite sides of the socket are made upwardly tapering, and preferably also the other two opposite sides 6 6 are made upwardly tapering. The cuts or chisels are placed in a series side by side and inserted in the socket, the outside cuts 7 7 of the series having the upper portion of their outer faces 8 8 tapered upwardly to correspond with the tapered faces 5 of the socket, the intermediate cuts 7<sup>a</sup> having parallel faces and the inner faces of

the outer cuts 7 7 also being parallel with said intermediate cuts, as shown in Fig. 2, the outside cuts thus serving to tighten the whole series of cuts when pushed inward. If the opposite edges 6 6 of the socket are made tapered, which is preferable, as above stated, the edges of all the cuts, both the outside ones 7 and the intermediate cuts 7<sup>a</sup>, are all made correspondingly tapered, as shown in dotted lines in Fig. 1.

The chisels may easily be driven in sufficiently far for them to be held by frictional contact with each other and with the inclined inner faces of the socket to hold them in position for use during the first operation without being driven back to the full depth of the socket, as shown in Fig. 2. After a few blows of the tool when in operation the working tools will be driven in farther and farther until they are forced back to the inner end of the socket, as shown in Fig. 3, the action of the outer tools 7 7 causing all the tools to be more and more firmly tightened. The tools will be forced backward into the socket both by the blow of the hammer of the pneumatic tool upon the upper end of the stock 1 of the working tools and by the rebounding action after the tools have struck the stone which is being worked upon.

Extending transversely through the head 2 is a slot 9, which extends both above and below the upper end 4 of the recess 3 and passes entirely through the head from side to side. The bottom 10 of this slot 9 is made on a level—that is, at right angles with the axis of the holder—and lies horizontal when the tool is in a vertical position. The top 11 of said slot is made inclined from end to end. A loosening-key 12 is provided which is horizontal on its lower edge and tapering on its upper edge of corresponding angle with the top 11 of the slot 9. The width and thickness of this key is such that the small end of the key may be passed entirely through the slot 9. When it is desired to release the tools, the key will be entered in the slot 9, as shown in Fig. 3, and by forcing it in by pounding on the larger end the action of the key will force the tools out of the socket. As the key fits the space between the upper ends of the tools and the upper side of the slot, the tools will all be forced out together without causing any abrasion of the tools upon each other.

If there is any too great looseness of fit of the group of chisels in the socket, this looseness may be taken up by inserting thin shims 13 between any two or more of the cuts, as shown in Fig. 4. Preferably these shims should be very thin and a number of them used rather than to have one thick one used, and preferably also they should extend to the inner end of the shanks of the working tools, but not necessarily to the forward ends. These shims are preferably

of some springy material, such as thin sheet-steel, or it may be rubber or any other suitable material.

In Fig. 6 the invention is shown as embodied in a hand bush-hammer having a head 14, provided with a hole 15 to receive a handle and having a socket 16 at each end of the head, each constructed in a similar manner to that already described and shown in Figs. 1 to 4, inclusive, and provided with cuts 7 7<sup>a</sup> of similar construction to those previously described.

In Fig. 7 the invention is shown as applied to a holder for use with surfacer-points. In this case the head 2 and socket are circular in cross-section, the surfacer-points 17 being also cylindrical with pointed ends. As shown in the drawings, three surfacer-points are thus arranged; but the number may be any desired, according to the size of the tool and purpose of use. The inner faces 18 of the walls of the socket are made upwardly tapering, as in Fig. 1, only the socket is circular in cross-section instead of being square, and the shanks 19 of the tools or points 17 are also tapered upwardly on the portion of the surface which comes in contact with the socket forming a beveled face 20, the faces of the tools which come in contact with each other being, however, parallel with each other.

By the form of construction above described there will be avoided any possible loosening of the tools by pressing them outward. This outward or lateral pressure will be kept up constantly as the tool is in use, and the tools will thereby be kept constantly in place by the action of the machine. The outside tools 7 7, which serve as the tighteners, cannot become loosened any more than those which are intermediate, and at the same time the stop at the upper end of the socket prevents them from becoming unduly tightened.

The tools may be of any number desired, according to the size of the tool and holder desired, and may be placed either in a straight series or otherwise grouped.

It is obvious that when the form of holder shown in Fig. 1 is used instead of having them placed in series side by side there may be used four square points by tapering the four inside surfaces of the socket and tapering the outside surfaces of the tools.

I claim as my invention—

1. A tool-holder having a head formed with a socket-recess in the end thereof, the recess having opposite inner faces inclined toward each other from the outer end inwardly the full depth of the recess, a plurality of working tools having shanks adapted to be inserted in the socket in parallel relation with each other, the outer faces of the shanks which bear against the inclined outer faces of the socket being tapered to correspond with the

inward taper of the socket, the inner end of the recess forming a solid seat for the inner ends of the tools, the shanks of the tools being adapted to be frictionally held in the  
 5 socket by engagement with the sides thereof when inserted part way into the socket and before being forced to their seat, the head being formed with a slot transversely through the head and intersecting the tool-socket and  
 10 extending both above and below the upper end of said socket, the upper side of said transverse slot being inclined and the lower side of said slot being horizontal and at right angles with the axes of the tools when inserted  
 15 in the holder, a tapered key having the upper edge inclined with relation to the other edge at the same angle that the inclined edge of said transverse slot bears to the horizontal edge thereof, said key being removable and  
 20 said shank so fitting the socket that after the key is withdrawn they may be forced inward the full depth of the socket, the solid inner end of the socket forming a stop for the inner ends of the shanks and said key-slot being of  
 25 sufficient depth back of the socket whereby when the working tools are all seated on the rear end of the socket, the said key may be again passed through said slot and engage with the rear ends of the shanks of the work-  
 30 ing tools.

2. A tool-holder having a head formed with a socket-recess in the end thereof walled on all sides except the entrance end, the recess having opposite inner faces inclined toward  
 35 each other from the outer end inwardly the full depth of the recess, a plurality of working tools having shanks adapted to be inserted in the socket in parallel relation with each other, the outer faces of the shanks which

bear against the inclined outer faces of the  
 40 socket being tapered to correspond with the inward taper of the socket, the inner end of the recess forming a solid seat for the inner ends of the tools, the shanks of the tools being adapted to be frictionally held in the  
 45 socket by engagement with the sides thereof when inserted part way into the socket and before being forced to their seat, the head being formed with a slot transversely through the head and intersecting the tool-socket and  
 50 extending both above and below the upper end of said socket, the upper side of said transverse slot being inclined and the lower side of said slot being horizontal and at right angles with the axes of the tools when inserted  
 55 in the holder, a tapered key having the upper edge inclined with relation to the other edge at the same angle that the inclined edge of said transverse slot bears to the horizontal edge thereof, said key being removable and  
 60 said shank so fitting the socket that after the key is withdrawn they may be forced inward the full depth of the socket, the solid inner end of the socket forming a stop for the inner ends of the shanks and said key-slot being of  
 65 sufficient depth back of the socket whereby when the working tools are all seated on the rear end of the socket the said key may be again passed through said slot and engage with the rear ends of the shanks of the work-  
 70 ing tools.

In testimony whereof I affix my signature in presence of two witnesses.

ENOS S. COSTA.

Witnesses:

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 WILLIAM A. COPELAND.